OCTOBER 29, 1956

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

THE HIGHWAY PROGRAM:

Big Business for Metalworking

Planning is ahead of schedule. Construction will bring industry rich opportunities for sales of materials and equipment to build roads and the industrial and commercial facilities which are certain to spring up along them—page 79

✔ Machining Aluminum on Automatics, page 134

✔ Iron Ore: Enough for the Winter, page 159

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Bucket crane of the Level-Luffing type operates speedily under EC&M Contra Torque Hoist Control

Bucket cranes in this fertilizer plant operate at high output with EC&M Contra Torque Hoist Control

HERE'S HOW EC&M FREQUENCY RELAY CONTROL improves A-C Bucket Crane performance

CONTRA TORQUE

FAST GETAWAY! Quickly responsive to the frequency of the induced-rotor voltage, **EC&M FREQUENCY RELAYS** match torque requirements to the load. They get the motor up to speed quickly for lowering the bucket and moving the trolley in or out. A lot of time saved between trips!

WIDE SPEED SELECTION! These relays permit starting-down on any master switch point. No waiting until last point is reached. Wider choice of speed gives greater flexibility in clean-up operations and speeds output!

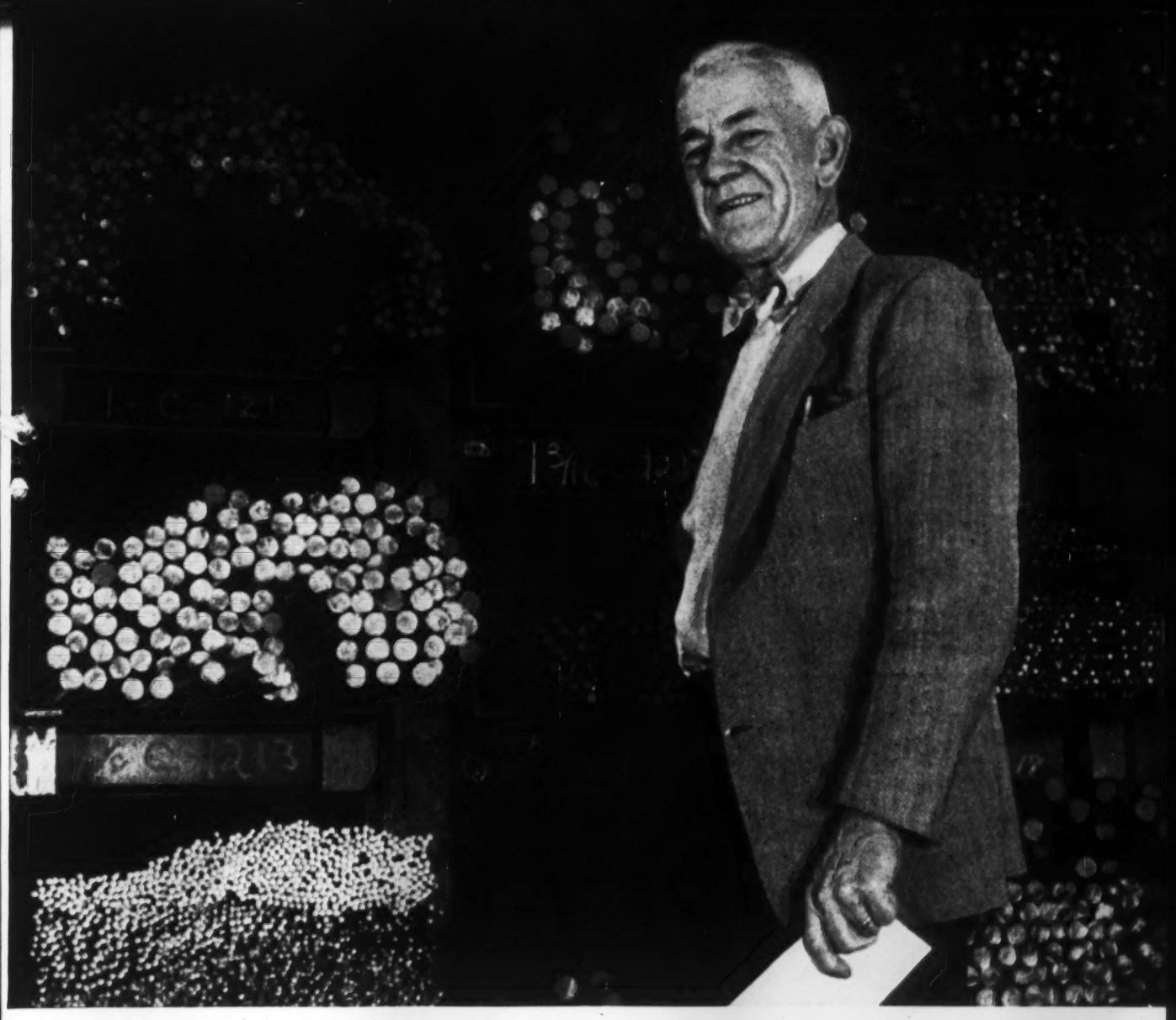
SMOOTH STOPPING! When checking motor-lowering speed, weak torques are provided for light loads or the empty bucket; stronger torques for heavier loads. Trolley motor is stopped and reversed smoothly under frequency relay automatic operation!

SPEED-LIMITING! Safety on all speeds. These relays (one set for hoisting and lowering) automatically shift motor connections to safeguard lowering operation with far greater skill than human hands.

SQUARE D COMPANY

EC&M DIVISION • CLEVELAND 28, OHIO

7407



He Runs a Supermarket Stocked with Steel

Maybe he never thought of himself in just this light, but the distributor of steel products is actually the proprietor of a supermarket. His clean, modern establishment is a "shopping center" where steel in many forms can be obtained on the spot. He displays his merchandise neatly, and any buyer is free to pick and choose. When an order comes in by phone, it is filled out of stock and is usually delivered within 24 hours.

The distributor, or warehouseman as he is often known, performs a highly valuable service. To the buyer of steel in small and moderate lots, he's a quick and reliable source of supply. He's always accessible; always easy to reach. Though able to furnish steel in substantial amounts, he also cheerfully handles orders that may yield but a few pennies profit.

In distributor stocks are such items as sheets, strip, plates, shapes, bars, tool steel, wire, hardware, wire rope, and other products you need daily. Available too are services like cutting, slitting, edging, sawing. And the distributor is an excellent source of technical advice; oftentimes he has his own laboratory for running tests.

You'll find the distributor of Bethlehem products always anxious to serve you. Look him up in your own community or one near by. He's a good man to know.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.
Bethlehem Pacific Coast Steel Corporation
San Francisco

BETHLEHEM STEEL

Call the distributor—your Shopping Center for Steel

"Bet a fish it's got **SKF** bearings!"

Don't take that bet, bird – unless you have fish to burn!

SKF is the company that sells *all four* basic types of bearings. And that means you'll find our bearings in more applications... in more places in the world... than any other bearings. In everything from roller skates to roaring jets, these bearings literally make the world go round. *Plus-quality* **SKF** Bearings are serving your industry, your family and you right now! 7728

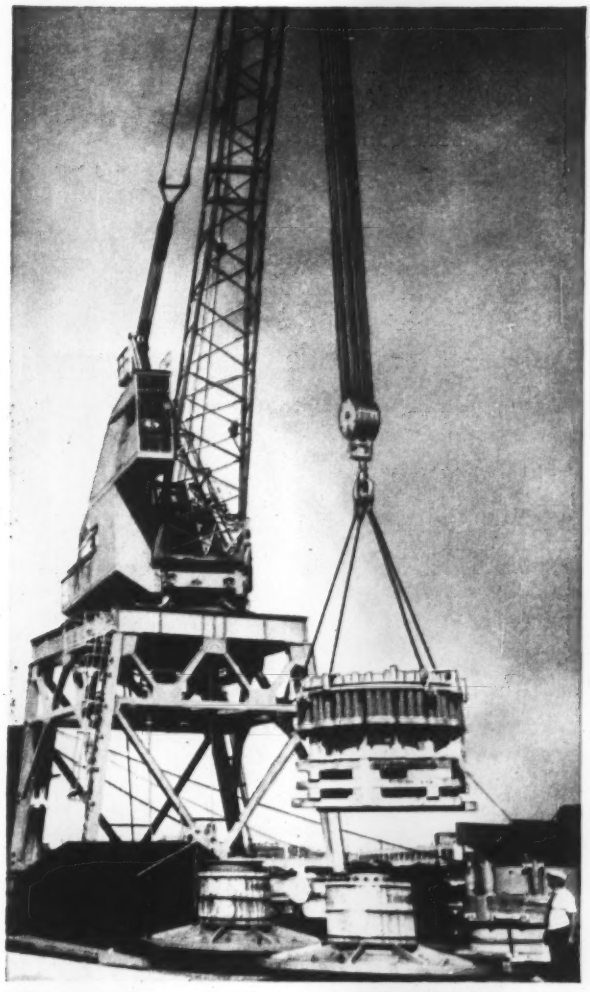
SKF—EVERY TYPE—EVERY USE

SKF

- *Ball Bearings*
- *Cylindrical Roller Bearings*
- *Spherical Roller Bearings*
- *Tapered Roller Bearings ("Tyson")*

*Reg. U.S. Pat. Off. Tyson Bearing Corporation

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.



Whatever your needs, Macwhyte makes the sling, wire rope, or assembly for your equipment. Here, two ATLAS Assembly E-2, Round-Braided Slings handle cargo. These balanced braided slings have an excellent reputation for safe, fast, easy handling.

These wire rope products
SAVE TIME AND MONEY

The ability of wire rope to serve you relies on the quality you buy and the selection of the proper material.

Because Macwhyte Company has a wide selection of quality products, you can be sure the sling, wire rope, or wire rope assembly you buy meets the needs and service conditions of *your* equipment, and is designed to give outstanding service at low operating cost.

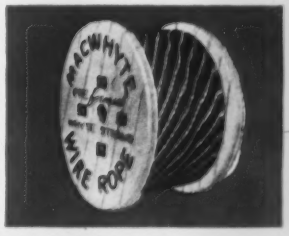
Your Macwhyte distributor will give you prices, literature, and catalogs, and can supply you promptly with standard or custom wire rope, cable assemblies, slings, aircraft cable, tie-rods, and swaged fittings.

MACWHYTE
WIRE ROPE · SLINGS · WIRE ROPE ASSEMBLIES

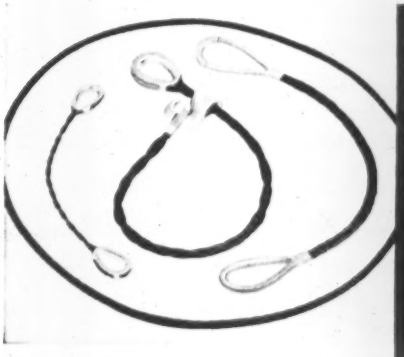
Macwhyte Company, 2912 Fourteenth Avenue, Kenosha, Wis.

Manufacturers of: Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal, Stainless Steel Wire Rope, and Wire Rope Assemblies. Special catalogs available.

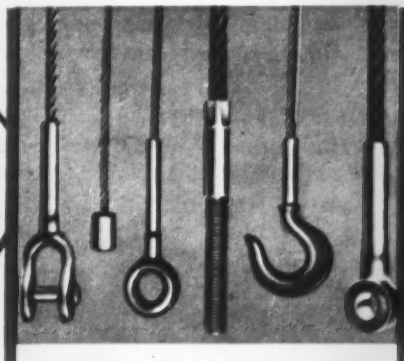
New York 4, 35 Water St.
Pittsburgh 19, 704 Second Ave.
Chicago 6, 228 So. DesPlaines St.
Detroit 3, 75 Oakman Boulevard
St. Paul 14, 2356 Hampden Ave.
Ft. Worth 1, P.O. Box 605
Portland 9, 1603 N. W. 14th Ave.
Seattle 4, 87 Holgate St.
San Francisco 7, 188 King St.
Los Angeles 21, 2035 Sacramento



Distributors conveniently located throughout the United States.

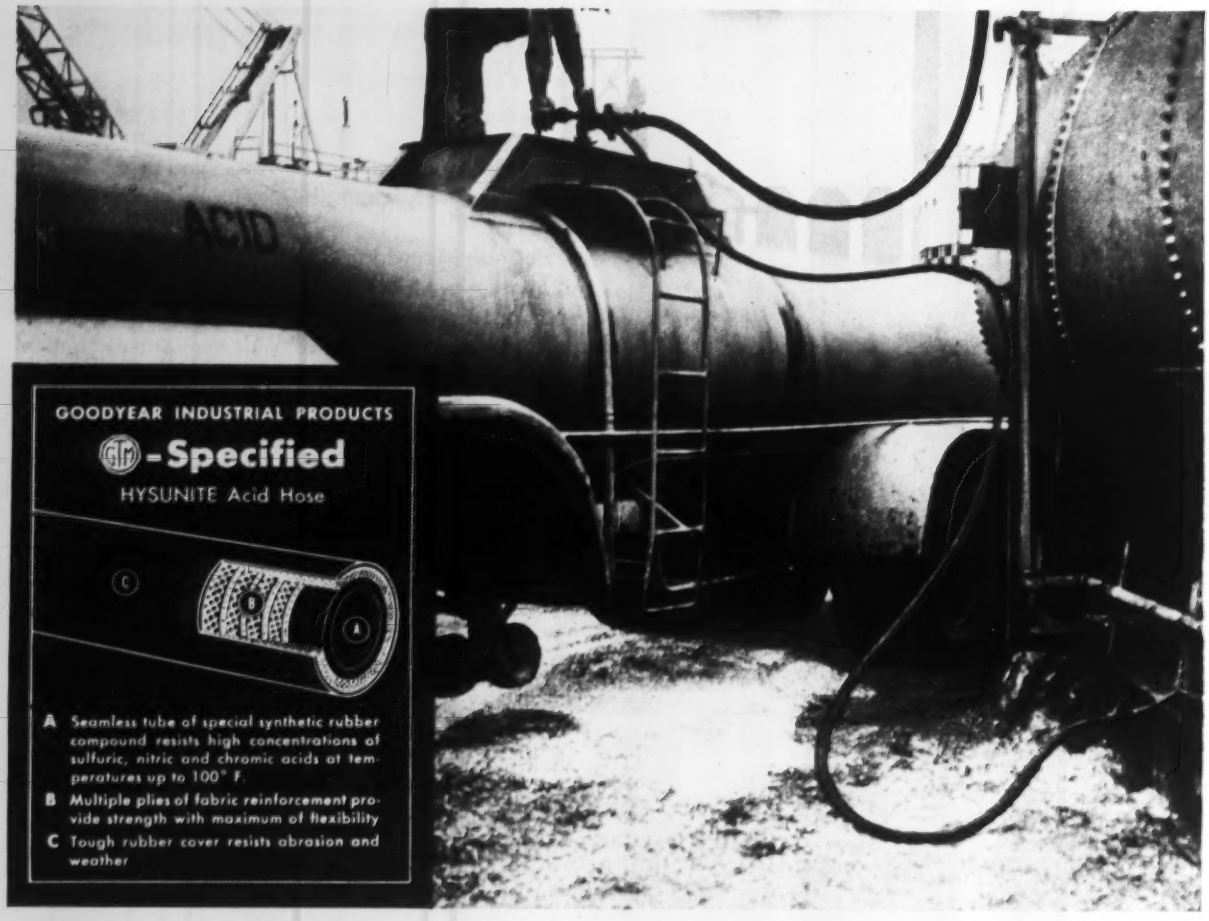


BRAIDED SLINGS. Hundreds of custom and standard designs in Round-Braided, Flat-Braided, Single-Part and Grommet slings are supplied for almost any material handling need. *Catalog S-8 gives complete information.*



WIRE ROPE ASSEMBLIES. Macwhyte Safe-Lock Wire Rope Assemblies are made to order in length, strength, and flexibility desired. Terminals are permanently attached to one or both ends. A wide selection of fittings are made in strengths from 500 to 85,000 lbs. and up. *Request Catalog 5601.*

WIRE ROPE. There are *a thousand and one* sizes and types of Internally Lubricated Macwhyte wire rope to give you the *right* rope for any equipment need. *Catalog G-16 lists all wire rope classifications and sizes, as well as general information on use and handling.*


ACID
GOODYEAR INDUSTRIAL PRODUCTS
G.T.M.-Specified
HYSUNITE Acid Hose
C
B
A
A Seamless tube of special synthetic rubber compound resists high concentrations of sulfuric, nitric and chromic acids at temperatures up to 100° F.
B Multiple plies of fabric reinforcement provide strength with maximum of flexibility
C Tough rubber cover resists abrasion and weather

G.T.M. increases acid hose life by 900%

ACID–66° Baume Sulfuric–was the problem at this eastern steel mill. Many types of hose were tried for its transfer from truck to storage tank. But the best hose delivered *only 2,500,000 lbs.* of acid, before embrittling and breaking.

Then the G.T.M.–Goodyear Technical Man–recommended his new HYSUNITE Hose, specifically developed to handle highly oxidizing acids in high concentrations at temperatures up to 100° F. This rugged hose handled a fabulous *26,500,000 lbs.* of acid–was good for many more pounds – when it was removed from service for thorough checking.

If you have hose problems, it will pay you to consult your Goodyear Distributor and/or the G.T.M. Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

HYSUNITE HOSE by

Hysunite–T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

GOODYEAR

THE GREATEST NAME IN RUBBER

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*

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The Metalworking Weekly

October 29, 1956 Vol. 139 No. 18

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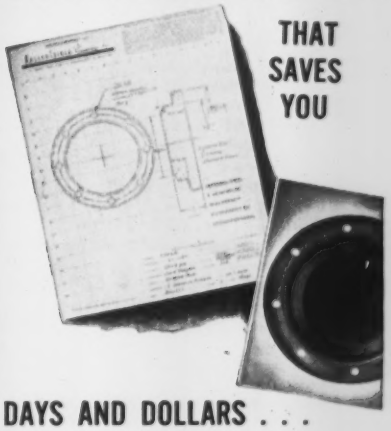
Here's the Magic
SKETCHFORMING SET



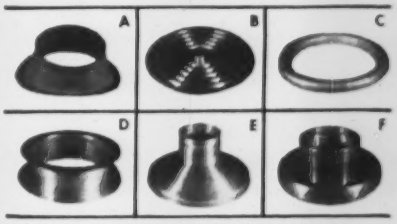
THAT SAVES YOU

DAYS AND DOLLARS . . .

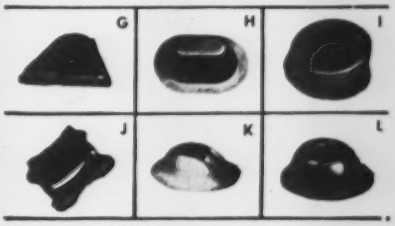
Makes clean copies instantly, without carbon paper. Keyed block background in light grey aids sketching and permits quick reference to details when discussing by telephone. Write Roland Teiner, Everett 49, Mass. for free copies. Use them to request quotations, order models or to develop cost reducing engineering changes.

TRY TEINER

for all fabrications including metal spinning, spinforming, hydroforming, welding and finishing.



METAL SPINNING AND SPINFORMING:
Typical items: A—Aircraft detail; B—Decorative cover; C—Retainer ring; D—Winding reel; E—Electronic shield; F—Electrical detail.

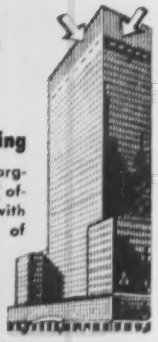


HYDROFORMING:
Typical items: G—Aircraft detail; H—Spindle cover; I—Aircraft detail; J—Auto bracket; K—Light reflector; L—Air cleaner.

ROLAND TEINER Company, Inc.
DEPT. 34 - 134 TREMONT STREET, EVERETT 49, MASS.
Telephone EVerett 7-7800
ENGINEERING REPRESENTATIVES IN PRINCIPAL CITIES

DIAMOND PERFORATED METAL

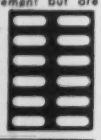
. . on the Socony Mobil Building



New York City's newest, largest and finest metal-clad office building, sheathed with more than 400,000 sq. ft. of patterned stainless steel, is also the largest commercial structure to be, initially, completely air conditioned. On the top three floors, devoted entirely to air conditioning and other mechanical equipment, the wall panels are perforated to permit free passage of air at low velocity.

It was our privilege to perforate the more than 40,000 sq. ft. of stainless steel sheet required for that purpose—under a subcontract and in accordance with the specifications of the engineers who designed the very modern air conditioning system.

We appreciated, very highly, the opportunity to participate in such an outstanding achievement but are equally interested in any other requirement for perforated metal—no matter how large or small—and have hundreds of specialized tool arrangements which assure prompt, accurate service. Catalog 39 contains complete working data and shows many interesting applications in its 32 large illustrated pages. Write for a free copy.



DIAMOND MANUFACTURING CO.
Box 32 WYOMING PENNA.

West Coast Plant, Diamond Perforated Metals Co
17915 So. Figueroa St., Gardena, California

IF METALWORKING PLANTS ARE YOUR PROSPECTS

STEEL can put you in touch with the important ones, those that do more than 92% of the industry's business. Tell the buyers and specifiers in these plants of the machines or materials you have for sale through an "Equipment — Materials" advertisement. For rates write STEEL, Penton Building, Cleveland 13, Ohio.

behind the scenes

Detroit Scribe Glows

Cometh now foxy Don Postma, STEEL's observing Detroit editor, seeking surreptitiously to pry secret policy information from the Cleveland office. In his formative years, Don served as an undercover man for Uncle Whiskers, and in a moment you will see how evasive he can be.

"Dear Shrdlu," he wrote. "Are you acquainted with shooks? And I do mean shooks, not schnooks. When I came across the word, I didn't know what it meant, so I asked H. M. Hunter, president, Harvan Co., Livonia, Mich. 'Shooks,' explained Mr. Hunter, 'are pieces of lumber precut to size for use in the fabrication of pallets, crates, boxes, skids, etc.' Mr. Hunter should know, because he orders, sells and uses shooks all the time.

"All this is apropos of nothing except to say that when I got my Oct. 1 copy of STEEL I was all shook up; on the skids as it were."

If Army sleuths were all like that, it's a wonder we ever won the war. Now that he has reached his subject, watch this reformed military gumshoe show his true colors: "The book fell open to page 104, and if you haven't checked page 104, Shrdlu, old boy, do so at once! What a luscious lovely. Now, knowing our policies on L.L.'s, I'm in a quandary. Will I get assignments to cover fashion shows and beauty contests? Will I be sent to interview dolls? Will—"

Another View

Before taking up this matter with the top brass, we quickly turned to the ad in question. It was prepared for the Atlas Mineral Products Co., Mertztown, Pa., and carried the caption: "Do Corrosion Problems Have You on the Fence?" Illustrating this thought was a young lady in a bathing suit sitting coyly on a rail fence. Since our interest in pictures of this nature is purely academic, we asked the art department secretary what *she* saw in it.

"It's just a girl," said June. "She's wearing a strapless, zebra stripe, one piece rayon Lastex, black and white, half skirt bathing suit, with a boned uplift-bra top. She's a wind-blown blonde, wearing an expandable bracelet, loop earrings and high heeled, backless toe-strap sandals. What's so interesting about that?"

Bet *you* never noticed all that, Don. It just proves that girls and boys are different.

Dig New Models

"Mirrors of Motordom" readers will be happy to learn that Detroit Editor Postma will soon begin reporting his test driving activities for STEEL. He will personally drive the 1957 models and tell us exactly what he thinks about individual performance. This is like having an inside line to the testing ground, isn't it? While *we* are still sensing the wonder of the three pedals in the old Model T Ford—and the miracle of using the reverse for braking purposes—the rest of the world is evaluating and comparing Hydramatic, Ultramatic, Powerflite, Dynaflow and other automotive engineering terms too difficult to spell, even. You're going to like this series, so watch for it.

Highways Are Happy Ways

This week's cover story, "Big Business for Metalworking: The Highway Program," page 79, is bound to fascinate everybody who wants to get his share of federal spending. Washington Editor James Morrissey worked hard on this one, and we think he has struck a nerve—a real money nerve. If you follow it carefully, it will lead you to government contracts, which, as you know, are often real ginger-peachy. There's a powerful lot of money marked for highway construction, neighbor, and it's only right that you should latch on to some of it. Here's an article that exerts influence. As a matter of fact, it almost stole STEEL Artist Art Bouhall. Art made the cover design, and he was so carried away by the winding road, he had to be forcibly restrained from leaping into his car and driving away over the horizon.

Shrdlu

(Metalworking Outlook—Page 73)

7 Big Advantages!

in this

This 113' pre-enameling machine was dry cycling four days after delivery. Capacity 100 racks per hour. Overall height of unit only 13'.

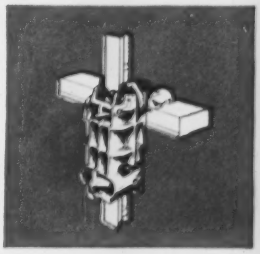
WAGNER PRECISION AUTOMATIC

- INCREASED LOAD CAPACITY
- PRACTICAL FLEXIBILITY
- LOWER PRODUCTION COSTS
- REDUCED MAINTENANCE
- 100% USER ADJUSTABILITY
- SIMPLIFIED INSTALLATION
- IMPROVED PLATING QUALITY

This modular precision electroplating machine is a big subject. Please send for our technical bulletin, learn all the facts, compare—or call the Wagner Man in your area. He'll study your problems and help you achieve better plating at lower costs.

Any day of the week you'll see us lift a 3200 pound automobile with the elevating mechanism of our standard automatic plating machine. That's just to dramatize the dynamic lift capacity of our modular type machine. This excessive capacity simply means that deflection under normal loads is minimum, thus strain on alignment mechanisms is eliminated, wear and downtime is reduced to the vanishing point. Your own personnel—any mechanic—can make precision adjustments of critical transfer members, including the main lift boom, carrier lift angle assemblies and carrier rail support brackets. Maintenance is simple as standard gear racks and pinions are used throughout the entire elevator mechanism (altho capacity can be increased 50% by substituting our heavy duty rack). Hardened guide rollers have positive lubrication—or central lubrication may be installed at low cost.

Here's how you get low cost installation and servicing, even later alterations. All details are interchangeable, precision drilled and machined, preassembled. Our modular design permits easy lengthening or shortening for long term production changes; parts, assemblies, even sections may be replaced. Every part is drilled, reamed, tapped and milled in special co-ordinated fixtures; sections are assembled in giant jigs for fool-proof self-aligning. A single hydraulic power unit interconnected to two hydromotors with micro adjustment of acceleration and deceleration permits work carriers to be lifted, transferred and deposited gently without jarring or loss of parts.



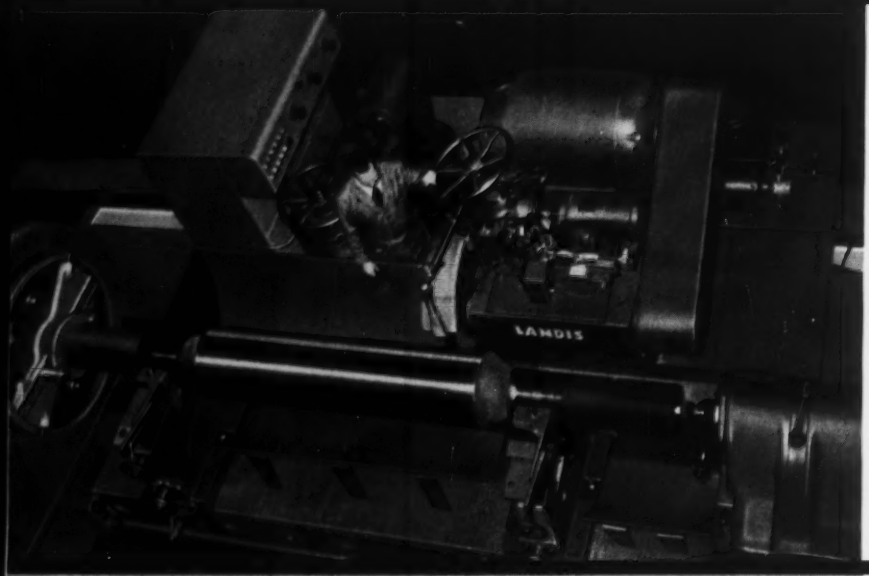
Typical pre-assembled single station elevator housing ready for bolting through jig-drilled holes in main carriage. Note adjustable roller guide brackets.

400 MIDLAND AVE., DETROIT 3, MICHIGAN

CHICAGO • CINCINNATI • CLEVELAND • INDIANAPOLIS • NEW YORK • ROCHESTER • GRAND RAPIDS

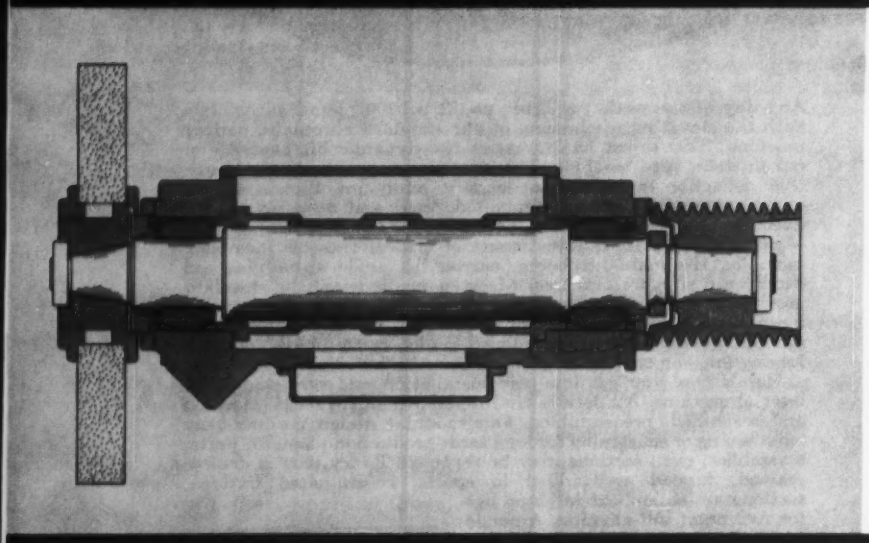
Wagner BROTHERS INC.

Features of Landis precision roll grinders



Conveniently grouped controls

Less operator fatigue and shorter setup time result from convenient positioning of operating controls. Full view of grinding wheel and roll from operating position.



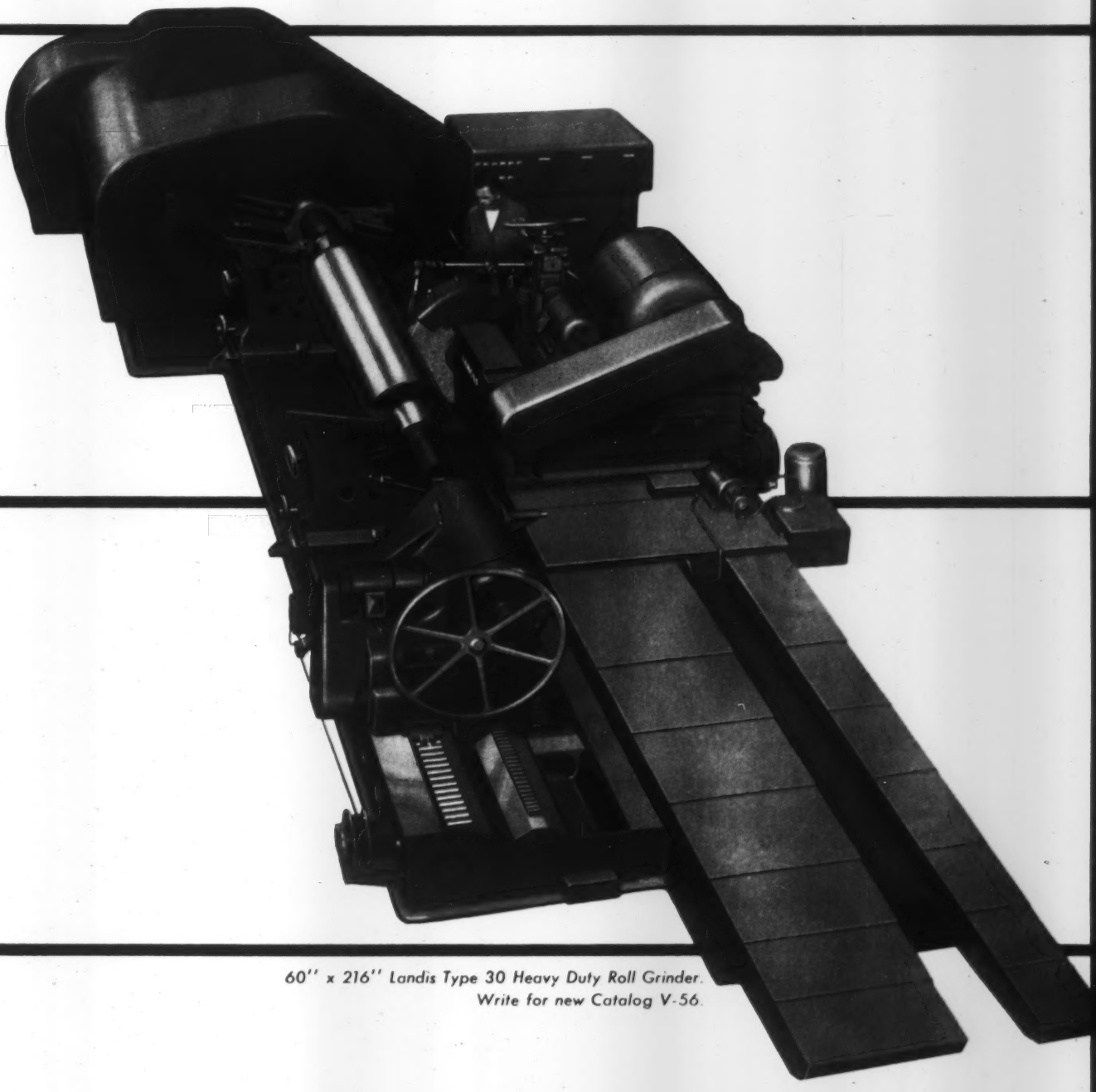
Exclusive Microsphere bearings

Close running clearance of Landis Microsphere spindle bearings plus "rigidized" wheel spindle, with increased diameter between bearings, permit heavy cuts and fine finishes.

Reserve power for heavy work

Ample horsepower for both wheel drive and roll drive, combined with massive rigid construction of machine, permits easy starting of rolls and heavy roughing cuts.

reduce grinding time . . . cut costs



60" x 216" Landis Type 30 Heavy Duty Roll Grinder.
Write for new Catalog V-56.

LANDIS
precision grinders

LANDIS TOOL COMPANY / WAYNESBORO, PENNSYLVANIA

Klozure Oil Seal with Silicone Sealing Element for high speed, high temperature applications such as transmission cases, diesel engine crankshafts, and aircraft accessory gear cases. (Model 65 illustrated.)

Will not **CRACK** *or* **HARDEN** *at high and low temperatures*

Garlock Silicone Rubber KLOZURE* *Oil Seals*

retain their original properties even after long exposure to temperature extremes that would quickly ruin organic rubber.

They are flexible and serviceable at temperatures as low as —90° F, and as high as 500° F . . . ideal for seals on automotive and aircraft products.

Extrusions and molded parts of Silicone Rubber are only part of "The Garlock 2,000" . . . two thousand different styles of packings, gaskets, and seals to meet all your needs. It's the *only* complete line . . . that's why you get unbiased recommendations from your Garlock representative. Call him today or write for Oil Seal Catalog No. 10.

*Registered Trademark

THE GARLOCK PACKING COMPANY,
Palmyra, New York

For Prompt Service, *contact one of our 30 sales offices and warehouses throughout the U.S. and Canada.*

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals, Rubber Expansion Joints

LETTERS TO THE EDITORS

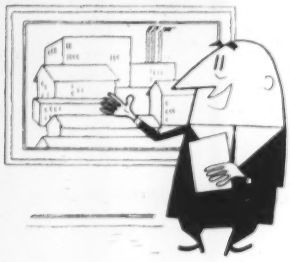
Data for Technical Files

In the Sept. 3 issue, there appeared an article, "Doing More with Short Run Dies" (page 79), which we find to be timely. It is No. 4 of the Production Ideas series; we would like extra copies of all four.

May we express appreciation for your fine help in giving us data for building up our technical files.

H. A. Sygnator
Tool Engineering Supervisor
Shakeproof Division
Illinois Tool Works
Elgin, Ill.

Picture of Future for Trainees



The Sept. 17 issue contains two articles we would like to distribute to those taking part in our training programs.

The first, "Steelmaking: Portrait of Tomorrow" (page 137), gives an excellent picture of the probable trends of development in steelmaking technology. The second, "Steel Expansion Rolls Along" (page 134), points out some of the financial problems connected with this changing technology.

We note you offer to furnish limited extra copies, but, in the quantities we need (approximately 400), we would like to have permission to reprint, with suitable acknowledgement to STEEL.

F. J. Burtt
Director of Industrial Relations
American Steel & Wire Division
United States Steel Corp.
Cleveland

• *Permission is granted.*

Search for Better Lubricants

We read with considerable interest an article which appeared in the Aug. 27 issue, called "Lubricants of Tomorrow" (page 80). We would appreciate receiving several reprints.

Herman C. Zwart
Engineering Associates
Division of Trymac Inc.
Erie, Pa.

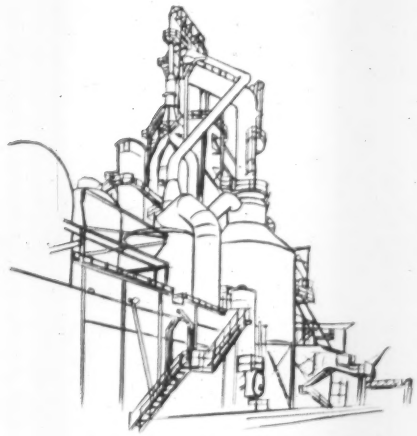
Report on Brainstorming

Last June, I requested and received a complimentary copy of the Apr. 23, 1956, issue of STEEL which contained your Program for Management article, "Ideas for Industry" (page 105).

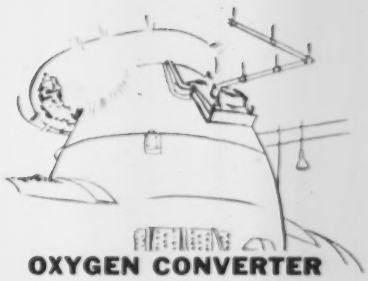
I thought you would like to know how we used your "brainstorming" plan explained in the article.

We tried this with a pastors and teachers' workshop on public relations,

(Please turn to page 12)

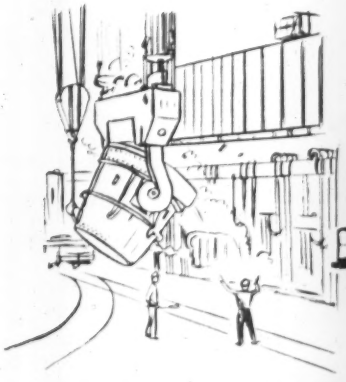


BLAST ENRICHMENT

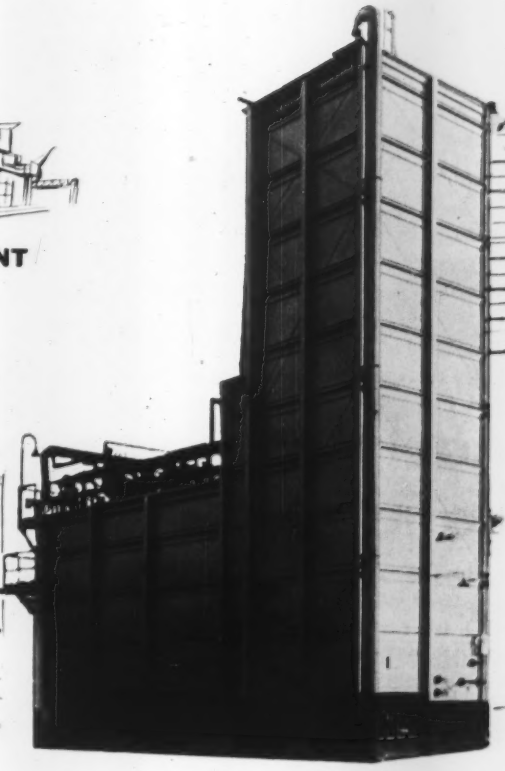


OXYGEN CONVERTER

SCARFING



FUEL ENRICHMENT



OXYGEN LANCE

ON-LOCATION OXYGEN GENERATORS

are an economic necessity in modern steel-making

Modern steel-making, of course, means "oxygen steel-making". Those steel companies that exploit this new technology to its fullest possibilities are the ones that will pay the biggest dividends.

Fuel enrichment in blast furnace and open hearth, the new oxygen converter, the oxygen lance, scarfing, scrap preparation and—perhaps soon—the desiliconizer, all require oxygen in such huge quantities as to make the use of on-location or "captive" generators an economic necessity. Our experience in providing these units for Weirton, Granite City, Jones and Laughlin and other prominent steel companies proves this point.

Air Products will install, on a lease basis without capital investment by you, if desired, an oxygen and/or nitrogen generating station to meet your particular requirements. We design and manufacture:

Large capacity tonnage generators for unlimited quantities of oxygen and nitrogen regardless of size, purity or cycle and "Packaged" High-Purity Generators, producing high-purity oxygen and nitrogen separately or simultaneously.

Ask us to investigate your requirements and provide you with a close estimate of the savings you can expect with your on-location generators.

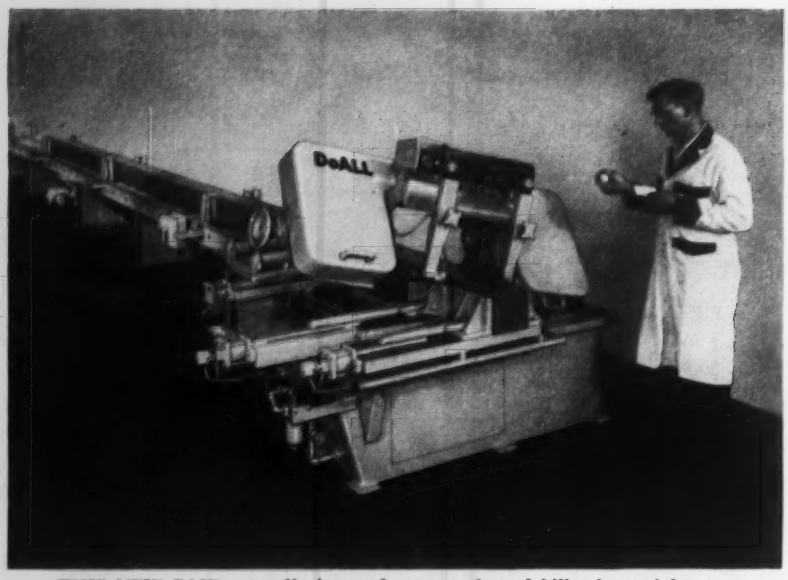
OUTPUT DEVELOPS EXPERIENCE— Air Products has built more than 800 successful gas separation plants.

LOW-COST OXYGEN...NITROGEN

Air Products
INCORPORATED

Dept. N, Box 528, Allentown, Pennsylvania

AP



THIS NEW SAW cuts off pieces of a tapered steel billet by weight . . .

How Machines Fight Inflation . . .

The machine pictured above is helping counteract inflationary pressures. It is reducing the cost of cutting special alloy steel.

When the steelworkers gained their recent wage increase and side benefits they did so at the expense of others . . . and partly at their own expense. For the cost of steel and everything made of steel sooner or later must be priced higher. It is an economic fundamental that higher wages without production of more goods simply means higher prices for the goods produced.

Fortunately, American industry is constantly developing new tools to increase human productivity. This makes higher wages possible and helps retard price increases. Thus, everybody benefits.

The DoALL Power Saw shown is cutting off lengths of tapered alloy steel billets. As the thickness of the billet tapers to smaller dimension, the saw automatically cuts off longer pieces so that each is of exactly required weight. These "weighed" pieces are mixed with other metals in a melting furnace. The resultant alloy is Alnico, a permanent magnet material used in thousands of industrial and household applications.

An Alnico magnet is the "latch" on this refrigerator door . . . another modern convenience made available by newer and better tools.

The DoALL saw employs a continuous-cutting saw band of high-speed steel, a recent development which outperforms all previous sawing methods.

More and better tools like this new DoALL machine are the only real weapon against inflation caused by wage increases. Both Labor and Government should encourage industry's development and use of such tools.

Reprints available for your employees.

FREE Power Sawing Handbook describes the newest concept for reducing cut-off costs. For your copy, call your local DoALL Store or write:

The DoALL Company

Des Plaines, Illinois
38 Local Sales-Service Stores

E-7

LETTERS

(Concluded from page 10)

held at Camp Limberlost near Lagrange, Ind., during August. We divided the conference into four groups and had a leader for each.

The brainstorming sessions were most effective. We received many compliments on that phase of the program. We heartily recommend it for progressive planning by groups.

Rev. Norman Temme
First Lutheran Church
Omaha, Nebr.

Meeting on Engineer Shortage

I was interested in the article, "Extra Hands for Engineers" (May 7, page 53). Will you please forward 12 reprints?

I would like to distribute them at a meeting in October which will be devoted to the utilization of technicians—a major factor in solving the problem of the shortage of engineers.

E. D. Vinogradoff
National Committee for the Development of Scientists & Engineers
Washington

Bring Reader Up to Date

I would appreciate an extra copy of the first seven articles in your 1956 Program for Management to bring me up to date.

If the articles prior to No. 8, "Motivating Men To Produce More" (Sept. 24, page 105), were as good as it is, I've been missing something.

Frank Muhly
Production Department
Cochrane Corp.
Philadelphia

New Converter Draws Interest

We are interested in the paragraph, "Centrifugal Converter," in the Technical Outlook of Sept. 24 (page 115).

We should be grateful for more information. Some of our specialists are in the U.S., and they might be able to arrange a visit to the plant in question.

R. Sewell
Information Officer
Research & Development Department
United Steel Companies Ltd.
Moorgate, Rotherham
England

• *Contact Harry W. McQuaid, Consulting Engineer, Union Commerce Bldg., Cleveland 14, O.*

Favorable Reprint Comment

I wrote you in July and requested permission to reprint 50 copies of the article, "Quality Control Charts Plating Savings" (July 23, page 90). Permission was granted, and reprints were forwarded to quality control supervisors in our organization.

Because of the favorable comments, we would like permission to reprint 50 copies of three articles that would be beneficial to our group. They are: "How Tight Is Tight?" (Feb. 27, page 114); "Quality Control in a Pipe Mill" (Sept. 10, page 148); and "Sample Your Incoming Quality" (Sept. 24, page 120).

L. K. Vollenweider
Manager
Statistical Quality Control Department
Deere & Co.
Moline, Ill.

• *Permission granted.*

now, Crucible low nickel stainless steels that meet many of your needs . . .

Here are two *new* Crucible grades, Rezistal type 201 and 202 that are similar in quality and properties to types 301 and 302 . . . but with desirable features all their own.

In the annealed condition, for example, Rezistal 201 and 202 have about 10% higher strength than 301 and 302, yet maintain almost identical ductility. This means that these grades can be fabricated with ease equal to their counterparts. In addition, their mill finishes and corrosion resistance to a wide variation of media compare most favorably with 301 and 302.

To sum up: Rezistal 201 and 202 have practically all the desirable properties of 301 and 302, *plus* some of their own. And they're available *promptly* in all forms. Write now for data sheets fully covering the properties of these new stainless grades. *Crucible Steel Company of America, Dept. AS, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

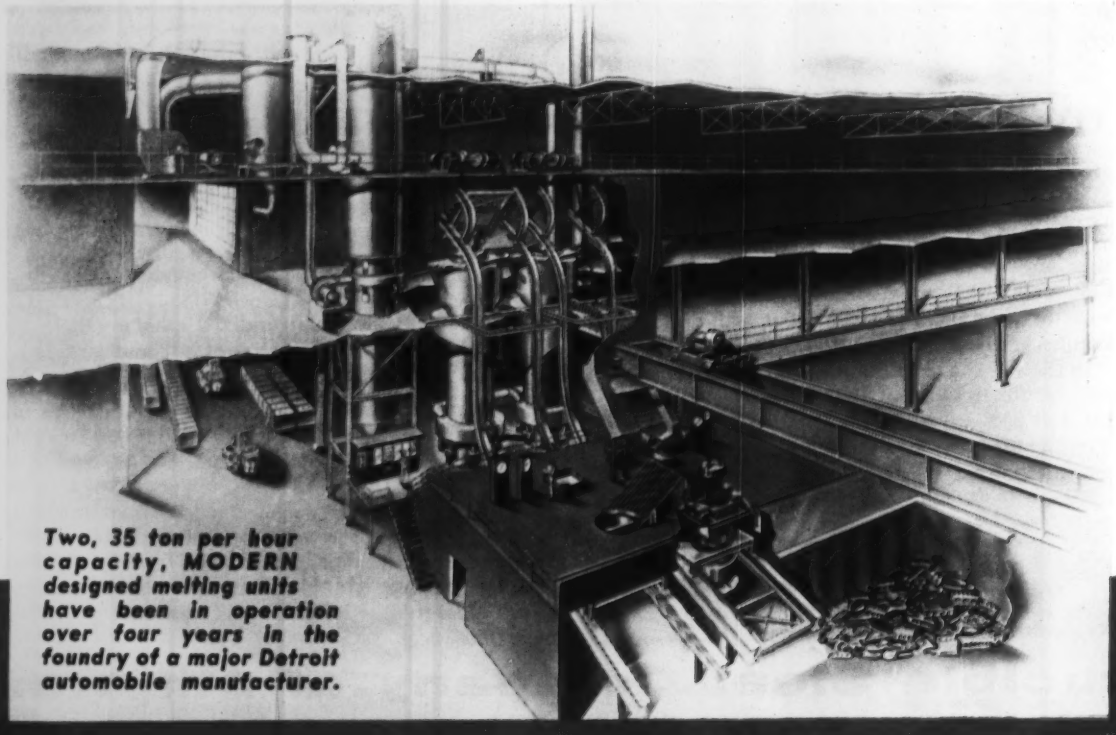
Crucible Steel Company of America

Canadian Distributor—Railway & Power Engineering Corp., Ltd.

Announcing!

A new, economical source of HOT METAL SUPPLY FOR YOUR MELTING SHOP!

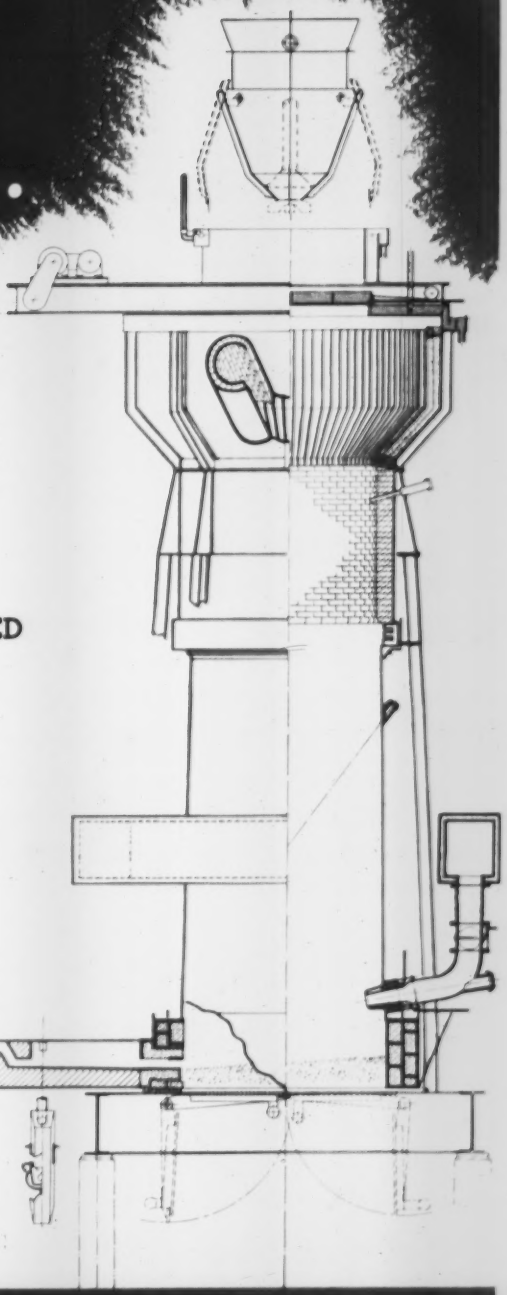
HOT METAL from LOW COST, unprepared scrap for your open hearths, electric furnaces or a new, top-blown oxygen converter is now available. Installation of a MODERN compact and complete cupola melting system in your present plant will increase capacity 30 to 40 tons an hour.



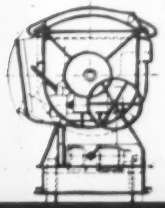
Two, 35 ton per hour capacity, MODERN designed melting units have been in operation over four years in the foundry of a major Detroit automobile manufacturer.

35 YEARS SUCCESSFUL

planning...
engineering...
manufacturing...
erection!



all are reflected in a MODERN ENGINEERED charging and melting system incorporating only tried and proved auxiliary equipment. AUTOMIZED controls are applied under the direction of America's foremost automation engineers: For all the facts write to MODERN Equipment Company, Port Washington, Wisconsin.



MODERN, externally water-cooled cupola.

MODERN

MODERN EQUIPMENT COMPANY
Port Washington, Wisconsin

Complete cupola melting and charging equipment with recuperative hot blast and dust emission cleaning systems.

HERE'S HELP for your tooling problems

Looking for a tool steel to do a specific job? Want to know where to buy a finishing carbide? This guide has the answers. It is a single source of information on more than a thousand different tooling materials. Knowing the job to be done, you can determine, with the guide, what product to buy and where to buy it. Cross indexes make it easy to locate tool steels and carbides by tradename, or to compile a list of sources for a single type.

40 PAGES

Copies of the Guide to Tool Steels & Carbides are available from Editorial Service, STEEL, Penton Bldg., Cleveland 13, O., at the following prices:

1 to 10	$2.00 ea.
11 to 50	1.90 ea.
51 to 100	1.80 ea.
101 to 200	1.70 ea.
over 200	1.60 ea.

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Announcing...

444

ALUNDUM®

A sensational new concept in abrasive manufacture and performance

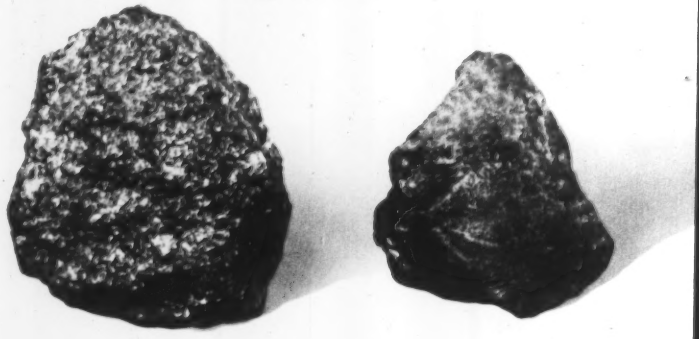
by NORTON ABRASIVES

®Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

MEET the New...

44 ALUNDUM abrasive

...a revolutionary Norton development for new "TOUCH of GOLD" economy in a wide range of grinding jobs



You Can SEE The Difference! The new Norton 44 ALUNDUM abrasive (right in illustration) differs radically in appearance from ordinary aluminum oxide abrasive as you can see from the 2 pieces shown here. The finer grain structure of "44" indicates its much denser, tougher composition. And the money-saving performance of this modern new abrasive is just as easy to spot — every time 44 ALUNDUM wheels go to work for you.

In new 44 ALUNDUM abrasive Norton brings you a combination of grinding quality, versatility and economy that has never before been equalled in a non-premium abrasive.

We want to emphasize that point. Although 44 ALUNDUM is non-premium priced, right there its resemblance to any regular aluminum oxide abrasive ends abruptly. It is definitely different and better in every way.

"44" is made differently, by a special, Norton-developed, electric furnace process that results in extreme toughness and ruggedness. This makes "44" the top performer for heavy duty grinding.

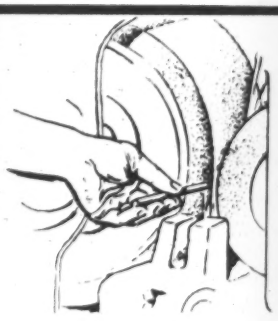
"44" performs differently. Compared to other non-premium priced aluminum oxide abrasive wheels, the new 44 ALUNDUM wheels cut faster, grind cooler and last longer. They hold form better, finish better and give more pieces per dressing. These are your "Touch of Gold" advantages that improve product quality, while reducing grinding time and costs.

"44" does more jobs. While not a cure-all, this new abrasive is a topnotch performer in widely varying types of grinding. For example:

PRECISION GRINDING	ROUGH GRINDING
CENTERLESS	SNAGGING
INTERNAL	WELD GRINDING
CYLINDRICAL	BILLET GRINDING
THREAD GRINDING	DISC GRINDING

MOUNTED WHEELS

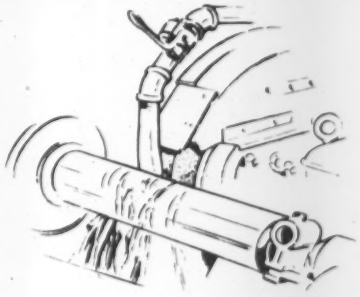
Proved In 1100 Tests. Before being offered to industry, 44 ALUNDUM wheels had the thorough testing given to every new Norton product. Over 1100 different tests were made — throughout the country and across "44's" entire job range. Here are some typical test reports:



CENTERLESS GRINDING

Job: Steel bushings. *Report:* "Faster cut, longer life and better finish."

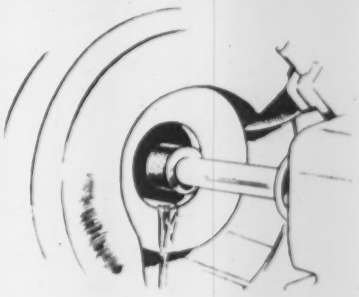
Job: Miscellaneous parts. *Report:* "44 ALUNDUM wheels much more versatile for different materials and set-ups. Time cut on one 14-hour job to 10 hours."



CYLINDRICAL GRINDING

Job: High speed steel dies. *Report:* "More pieces per dressing, cooler cutting, 30% longer life. Best wheel ever used."

Job: Miscellaneous steel parts. *Report:* "10% more pieces per dressing and 10% longer wheel life."



INTERNAL GRINDING

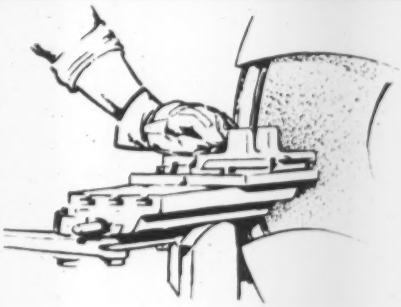
Job: Heavy duty hardened steel bushings. *Report:* "Even breakdown with excellent cutting action and less glazing. Half the dressings required with previous wheel."

Job: Steel gear housings. *Report:* "44 ALUNDUM wheels freer cutting, hold form better with less dressing and improved finish."

SNAGGING

Job: Offhand snagging, welded iron sections. *Report:* "80% longer wheel life and much faster cut."

Job: Offhand grinding steel parts. *Report:* "Faster cutting, better finish, much less burn."



DISC GRINDING

Job: Coil springs. *Report:* "Production increased from 100,000 to 125,000 springs."

Job: Stainless steel castings. *Report:* "Freer cutting, less burr and longer disc life."

MOUNTED WHEELS

Job: Snagging cast steel. *Report:* "Faster cut and 30% longer wheel life."

Job: Deburring steel welds and stampings. *Report:* "Four times longer lasting, with equal rate of cut."

Adding Up

Anything you can grind with non-premium priced aluminum oxide abrasive you can grind with 44 ALUNDUM abrasive — in every case at least equally well, in most cases a great deal better.

And you can do *more* jobs with tough, versatile "44". A real workhorse abrasive, it delivers thoroughbred performance that means more and better grinding for less money.

44 ALUNDUM wheels are available in all the popular Norton bonds. Already these new wheels are solving a lot of grinding problems, for a lot of users. How about letting them tackle yours — right now?

See Your Norton Distributor for further facts. Or write to the nearest district office of NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. Behr-Manning Company, Troy, N. Y., division of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

NORTON

ABRASIVES

Making better products... to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels Grinding Machines • Refractories

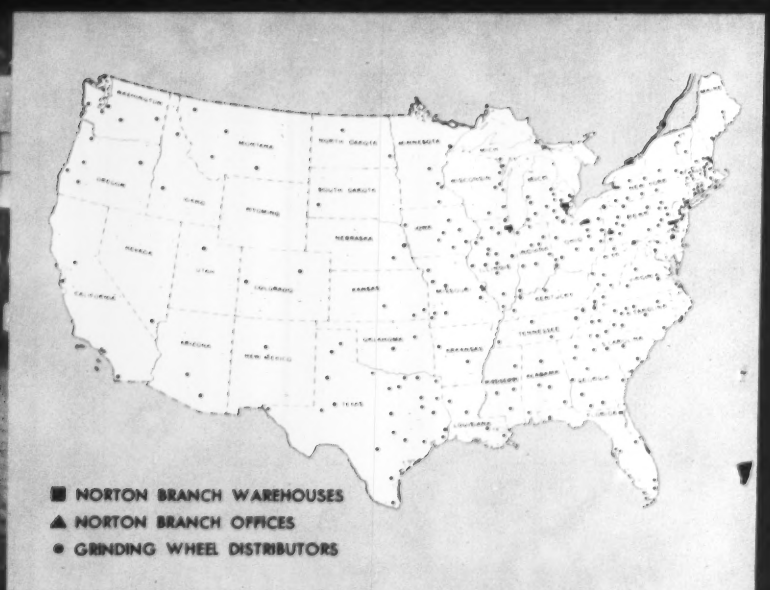
BEHR-MANNING PRODUCTS: Coated Abrasives Sharpening Stones • Behr-cat Tapes

On preceding pages you've read the benefit story of a great new Norton product. Here is . . .

The service story behind the new 44 ALUNDUM abrasive

"NORTON CITY"—ABRASIVE CAPITAL OF THE WORLD, contains over a mile of buildings, housing the most modern equipment ever devised for producing grinding wheels and other abrasive products. Here, too, 180 technicians in 19 specialized laboratories maintain Norton's long leadership in research and development. From this leading source of abrasive progress have come many news-making "firsts" — to which new 44 ALUNDUM abrasive is the latest addition.

COMPLETE STOCKS, STRATEGICALLY LOCATED. Gigantic stockrooms in the Worcester plant hold products totalling over 500,000 different grinding combinations. Norton warehouses are located in important industrial centers. Both the Worcester stockrooms and the regional warehouses carry generous supplies of the new 44 ALUNDUM wheels. And your Norton Distributor is careful to keep his own stocks — including 44 ALUNDUM wheels — fully adequate to the needs of his area.



Your Norton Distributor, one of over 315 in the United States alone, is your direct connecting link with the largest, most efficient service and supply system in the entire abrasive field. He can serve you in many important ways. For example:

The world's broadest line of abrasive products to choose from.

Practical aid in any grinding problem.

And for unusual problems he can always call in a Norton Abrasives Engineer.

Prompt deliveries — and emergency deliveries to help you avoid costly shut-downs.

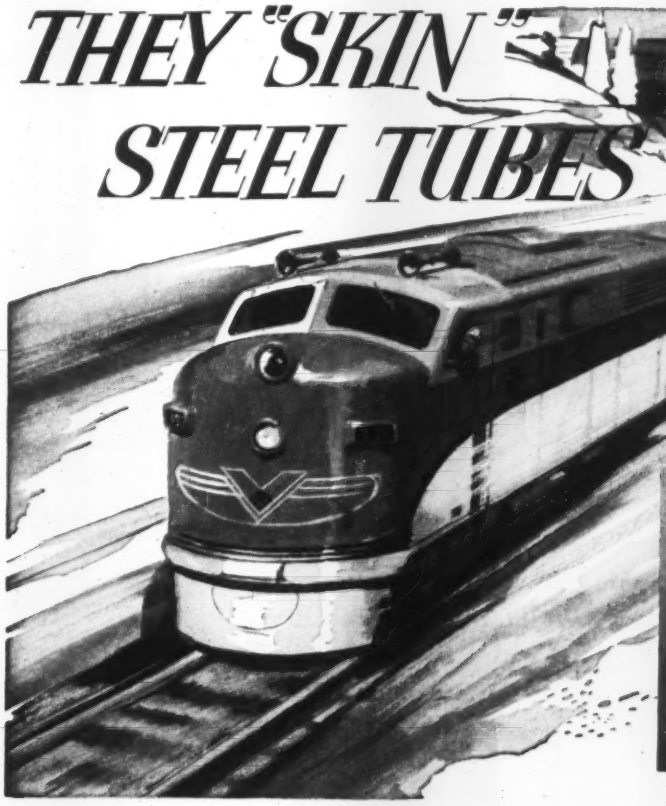
Ask him for details on how the new 44 ALUNDUM wheels can bring you the product-improving, profit-boosting "Touch of Gold". Or write your nearest Norton district office.

NORTON
ABRASIVES

Making better products... to make your products better

VV-1735
8-56

THEY "SKIN" STEEL TUBES to put PEP in this DIESEL!



Courtesy: Van der Horst Corp. of America

This powerful diesel loses its pep when cylinder liners become excessively worn. Formerly, this reoccurring ailment called for reboring — an operation that reduced the liner wall and its mechanical strength. In time, costly castings had to be scrapped. Now — a unique application of Frasse tubing helps put them back in service . . . indefinitely! Here's how.

By means of a newly developed electrolytic bath, the bore of the worn liner is plated with a precise layer of pure iron etched from the surface of a steel tube. It is then restored to original size — ready for service again.

The success of this precision plating operation depends on quality tubing that is dimensionally uniform. Frasse tubing — from warehouse stock — has met this rigid requirement for many years *without a single rejection.*

There is no fear of non-uniformity when you work with Frasse tubing. You get the same trouble-free quality with every order. And, remember Frasse tubing specialists are available to consult with you in applying tubing to your product advantageously, or in solving a tube problem. Whenever you need tubing — you'll be pleased with the extra services you get — simply by calling Frasse.

Frasse for Tubing....

Seamless and Welded Mechanical Tubing
Pressure, Condenser and Hydraulic Tubes
Stainless Tubing, Seamless and Welded
Stainless Pipe, Valves and Fittings
Aluminum Tubing, Pipe and Fittings
PVC Plastic Pipe, Valves and Fittings

Peter A. Frasse & Co., Inc.

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CINCINNATI RIGID SHAPERS

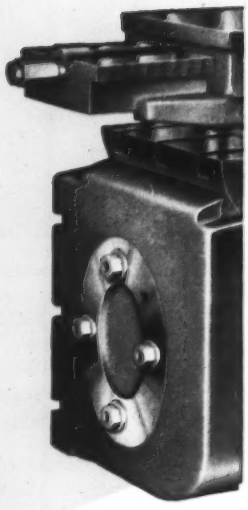
New—modern—these Rigid Shapers offer faster, more convenient controls, greater accuracy, greater dependability. The New nodular iron ram, trunnion and vise, and wide heavily ribbed column give a new rigidity—increase accuracy in cutting.

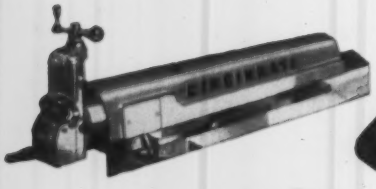
The New slot-free ram also eliminates the manual clamping of ram adjustment—a time saving feature.

A speedy, dependable electro-magnetic brake and clutch insure a faster performance.

50 P.S.I. pressure lubrication, exclusive on Cincinnati Shapers, is a real insurance against wear and a guarantee of long trouble-free performance.

Write for the circular on the New Rigid Shapers.

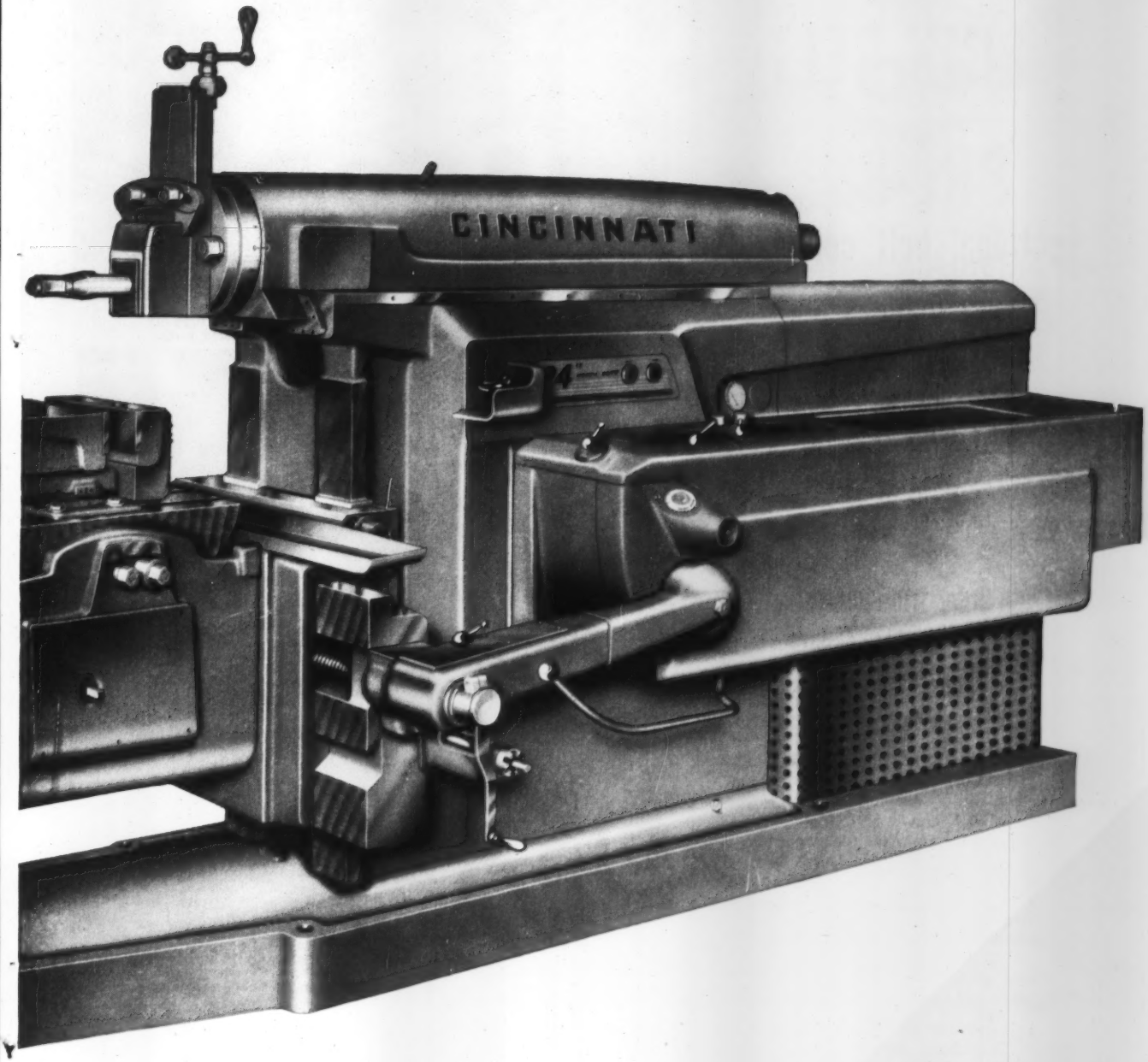




Nodular iron, slot-free ram

Electro-magnetic Clutch and Brake

The only shaper with 50 P.S.I. lubrication



THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

CINCINNATI

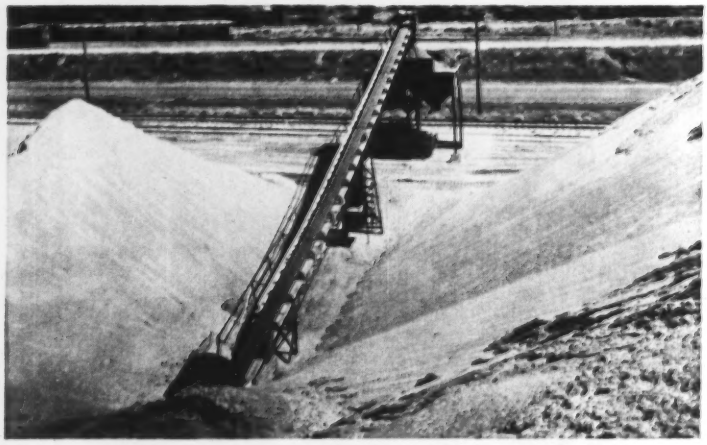
Now! It's

LINK-BELT

PRE-BILT

sectional belt conveyors

for



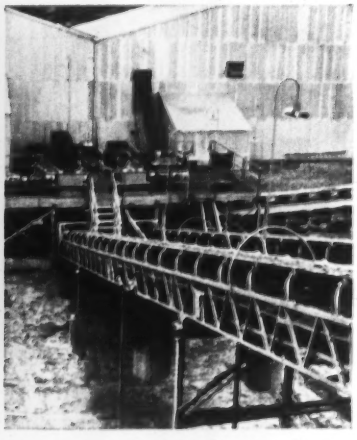
Link-Belt conveyors efficiently stock and reclaim four sizes of sand and gravel at one of the industry's most modern yards.

EASY SELECTION... QUICK DELIVERY

Order from nearest of 9 plants—reduce costs and delays

HERE's today's top answer to efficient, economical, long-life bulk handling — Link-Belt PRE-BILT sectional belt conveyors. They combine standard products, sectional truss frames and supporting bents to meet your exact requirements. Let a Link-Belt representative help you choose from 27 standard, packaged components — with drives up to 40 hp . . . 18, 24, 30 and 36-in. belt widths . . . 24 and 42-in. truss depths. For the full story, call your nearest Link-Belt office.

Inclines like this pose no special problems for highly-adaptable Link-Belt PRE-BILT sectional belt conveyors.



Conveyor with 30-in. wide belt handles iron ore concentrate and tailings from washing plant to loading hoppers.

Book 2579 outlines Link-Belt PRE-BILT sectional belt conveyor advantages. Write for your copy today.

FROM SELECTION TO OPERATION...AS SIMPLE AS THIS

EASY SELECTION. Your Link-Belt representative will help you select the best combination of PRE-BILT sectional belt conveyor components.

PROMPT QUOTATIONS. He will prepare a comprehensive and accurate estimate of requirements for installations that permit "on-the-ground" survey.

SIMPLIFIED PURCHASE. Parts are standardized, interchangeable, all available from one supplier. Link-Belt representative can furnish all necessary data.

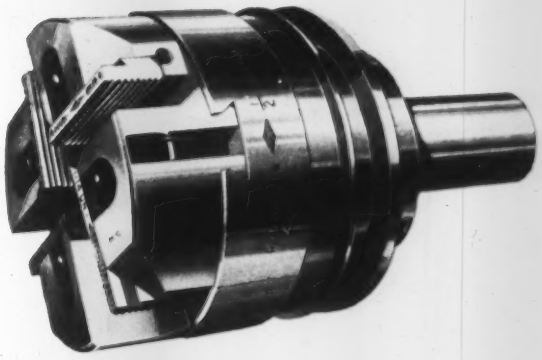
QUICK DELIVERY. PRE-BILT conveyors are built at nine strategic locations and are shipped from the plant nearest you.

FAST INSTALLATION. Can be readily handled by your own erectors in most cases. Link-Belt can also furnish complete erection service and supervision.

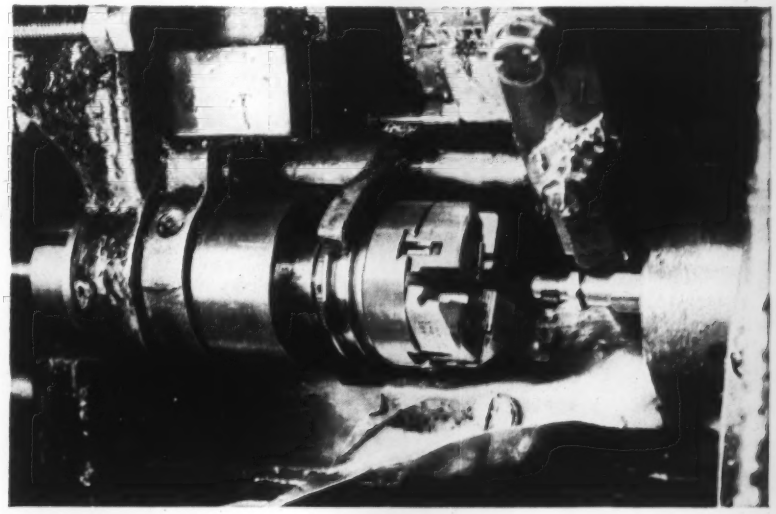
LINK-BELT

BELT CONVEYOR EQUIPMENT 14.113

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.



Economy Threading On Limited Clearance Automatics



To assure economy threading on automatic screw machines where limited die head clearance is a major factor Frank H. Wilson Co., Inc. in Detroit, Michigan use the ½" LL LANDEX Head. Applied to one of their small Acme-Gridley's for threading tubing nuts this head cuts ½", 20 pitch UN threads ⅜" in length on B1113 screw stock to a class three fit. An average of 20,000 pieces are threaded between chaser grinds.

Compactly designed with only a 2 7/16" swing the ½" LANDEX will thread all diameters from #4 to ½". A minimum number of working parts made of hardened and ground alloy steel, chaser holders designed to eliminate warpage and springing, and the use of precision LANDIS Tangent Chasers . . . all contribute to the high degree of rigidity and accuracy of this LANDEX Head.

Compare the chaser lengths in the illustrations and note the long life this LANDIS User has received from the chasers used in this application. These chasers will still produce thousands of threads as (1) LANDIS Tangential Chasers are usable for 80% of their original length; (2) only a few thousandths of metal need be removed from a chaser when regrinding; (3) when regrinding the same amount of metal need not be removed from each chaser; (4) long chaser life is received between grinds. These are the basis for economy in any threading operation.

For further information on this LANDEX Head and on other LANDIS Heads using Tangential Chasers and designed for all types of thread-cutting operations write for Bulletins F-80 and F-90. Please send specifications when writing.

LANDIS *Machine* COMPANY

396 WAYNESBORO • PENNSYLVANIA • U. S. A.

Here's a drum that can't be beat!

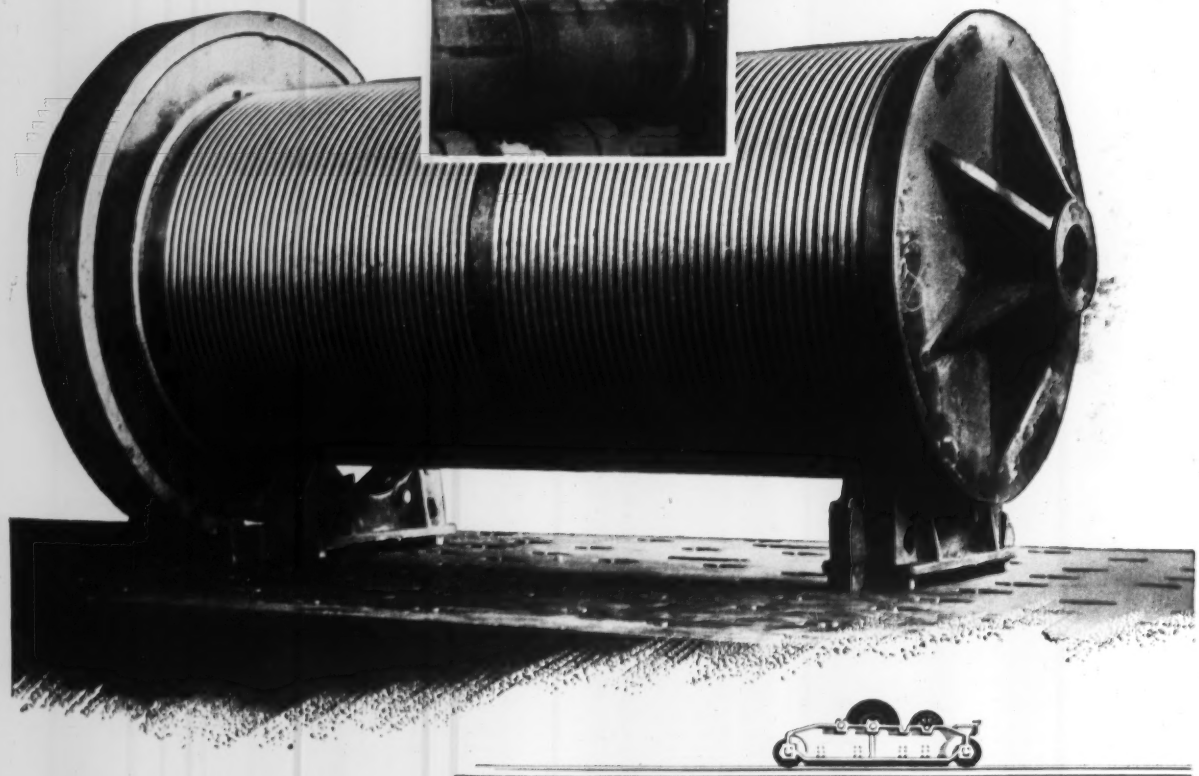
• *Fabricated drums* in Morgan cranes are structurally stronger than cast drums . . . yet they weigh less.

Automatic welding of Morgan drums with the world's largest continuous welding machine assures uniform, sound joints and seams.

Crane girders, too, are welded automatically, making them stronger and lighter. Morgan welders are qualified in accordance with A.S.M.E. and A.W.S. codes.

Performance records prove conclusively that Morgan cranes are the best in the business . . . cost less to operate and maintain. Let our representative show you how to save the most by buying the best . . . Morgan!

Automatic welding speeds up to 120" per minute are achieved on Morgan's continuous welder. Perfect welding penetration assures uniform, strong welds.



The Morgan Engineering Company, founded in 1868, manufactures overhead electric traveling cranes, gantry cranes, open hearth special cranes, plate mills, blooming mills, structural mills, shears, saws, and auxiliary equipment.

THE MORGAN ENGINEERING CO. *Alliance, Ohio*

CALENDAR
OF MEETINGS

Oct. 29-30, Refractories Institute: Fall meeting, Homestead, Hot Springs, Va. Institute's address: 1801 First National Bank Bldg., Pittsburgh 22, Pa. Executive secretary: Avery C. Newton.

Oct. 29-31, Truck Body & Equipment Association Inc.: Annual meeting, Sherman hotel, Chicago. Association's address: 1616 K St. N.W., Washington 6, D.C. Secretary: Arthur H. Nuesse.

Oct. 29-Nov. 1, American Institute of Steel Construction Inc.: National convention, Greenbrier, White Sulphur Springs, W. Va. Institute's address: 101 Park Ave., New York 17, N.Y. Secretary: M. Harvey Smedley.

Oct. 29-Nov. 1, Wire Association: Annual meeting, William Penn hotel, Pittsburgh. Association's address: 453 Main St., Stamford, Conn. Secretary: Richard E. Brown.

Oct. 30-Nov. 1, National Fluid Power Association: Fall meeting, Hotel Cleveland, Cleveland. Association's address: 1618 Orrington Ave., Evanston, Ill. Secretary: Barrett Rogers.

Oct. 30-Nov. 2, Gray Iron Founders Society Inc.: Annual meeting, Homestead, Hot Springs Va. Society's address: National City—E. 6th Bldg., Cleveland 14, O. Executive vice president: Donald H. Workman.

Oct. 31-Nov. 2, Anti-Friction Bearing Manufacturers Association Inc.: Fall meeting, Ponta Vedra Inn, Ponta Vedra, Fla. Association's address: 60 E. 42nd St., New York 17, N.Y. Secretary: H. O. Smith.

Oct. 31-Nov. 2, Industrial Management Society: National time and motion study and management clinic, Sherman hotel, Chicago. Society's address: 35 Wacker Dr., Chicago 1, Ill.

Oct. 31-Nov. 2, National Metal Trades Association: Convention, Conrad Hilton hotel, Chicago. Association's address: 337 W. Madison St., Chicago 6, Ill. Secretary: Charles L. Blatchford.

Nov. 1-2, Society of Automotive Engineers Inc.: National diesel engine meeting, Drake hotel, Chicago. Society's address: 29 W. 39th St., New York 18, N.Y. Secretary: John A. C. Warner.

Nov. 1-4, National Tool & Die Manufacturers Association: Annual meeting, Hotel Statler, Hartford, Conn. Association's address: 907 Public Square Bldg., Cleveland 13, O. Executive secretary: George S. Eaton.

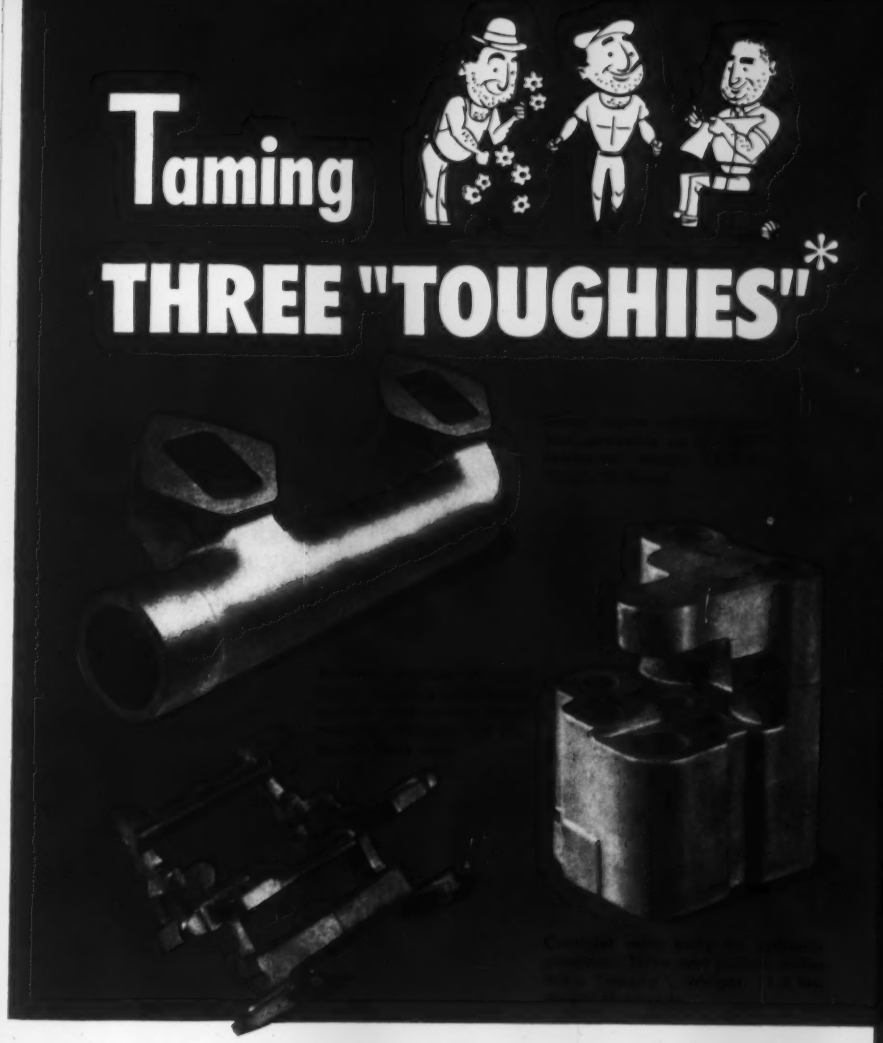
Nov. 7-9, Steel Founders' Society of America: Annual technical and operation conference, Carter hotel, Cleveland. Society's address: 606 Terminal Tower, Cleveland 13, O. Secretary: George K. Dreher.

Nov. 8-9, Society of Automotive Engineers Inc.: National fuels and lubricants meeting, Mayo hotel, Tulsa, Okla. Society's address: 29 W. 39th St., New York 18, N.Y. Secretary: John A. C. Warner.

Nov. 12-16, National Electrical Manufacturers Association: Annual meeting, Traymore hotel, Atlantic City, N.J. Association's address: 155 E. 44th St., New York 17, N.Y. Managing director: Joseph F. Miller.

Nov. 25-30, American Society of Mechanical Engineers: Annual meeting, Hotel Statler, New York. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Nov. 26-27, Wire Reinforcement Institute Inc.: Fall meeting, Jung hotel, New Orleans. Institute's address: National Press Bldg., Washington 4, D. C. Managing director: Frank B. Brown.

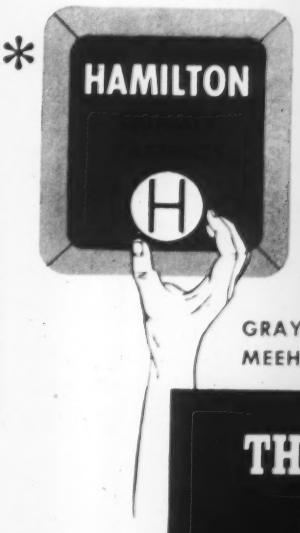


Turn your tough casting jobs over to Hamilton Foundry . . . the castings with intricate coring . . . wide range of metal thickness . . . tight dimensional tolerances . . . or high physical specifications. Hamilton thrives on licking the problem jobs.

Hamilton Foundry's skill and experience . . . seasoned engineers . . . and top quality control assure the correct translation of your specifications in the final product. Hamilton Foundry's wide variety of irons permits unusual flexibility of physical property ranges.

No matter how complicated the design, depend on HAMILTON QUALITY CASTINGS® for smoother, lower-cost production in your plant.

Call on Hamilton Foundry for your casting "toughies"



GRAY IRON • ALLOYED IRON
MEEHANITE • NI-RESIST • NI-HARD

THE HAMILTON FOUNDRY
AND MACHINE CO.
1551 Lincoln Avenue • Hamilton, Ohio
Phone TWinbrook 5-7491

H56-3

Predictable

THE AIR-HARDENING MATCHED SET

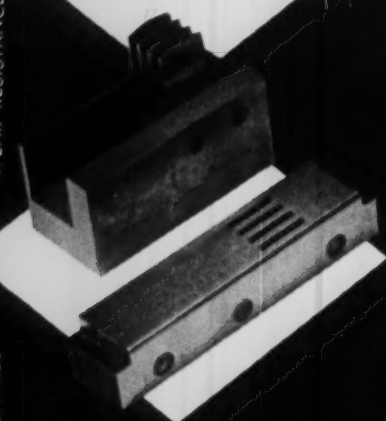
THE OIL-HARDENING MATCHED SET

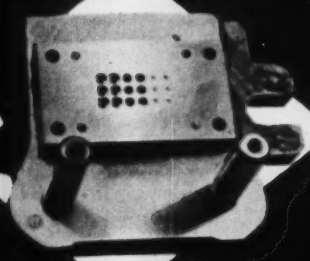
THE WATER-HARDENING MATCHED SET

No. 610
AIR-WEAR

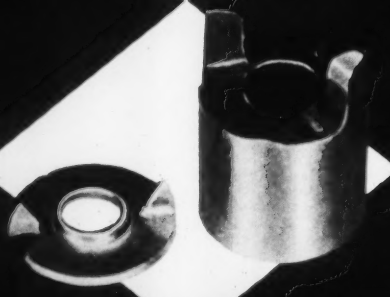
HAMPDEN
OIL-WEAR

K-W
WATER-WEAR

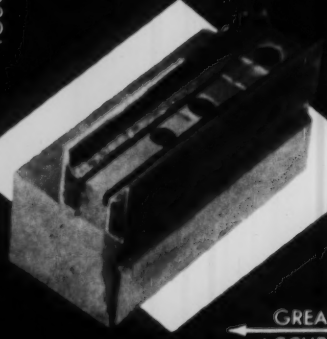




II SPECIAL
WATER-HARD



R.D.S.
OIL-TOUGH



GREATER WEAR RESISTANCE

GREATER TOUGHNESS

GREATER HARDENING ACCURACY AND SAFETY

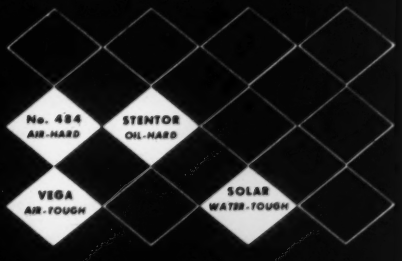
GREATER HARDENING ACCURACY AND SAFETY

RED

performance

THE RED-HARD
MATCHED SET

® U. S. Patent Office. The Carpenter Steel Co., Reading, Pa.



of tools, dies and parts is yours with *Carpenter's* simplified Matched Set Method of die steel selection

when you want *RESULTS* . . .

on tools and dies for mass production of your products . . . count on a Carpenter Matched Tool and Die Steel. The manufacture of this patented screw anchor is a good example of working with the Matched Set Method to achieve improved results. Several Carpenter grades were selected for dies to mass-produce screw anchor parts in a highly competitive market. The dies shown to the left are only a few of many used on this job. The toolroom foreman says the Matched Set Method helps the company keep costs at rock bottom. Downtime has never been a problem, and production is maintained at a high level with little maintenance.

For a complete story on this job, ask your Carpenter representative to show you "Fact File No. 2000". This Report is one of hundreds based on actual plant records given to us by industry to prove conclusively the improved results obtained with Carpenter Matched Tool and Die Steels. When will you join the growing number of plants who are enjoying better, lower-cost results like these?

when you want *ACTION* . . .

pick up your phone and dial Carpenter's nearest Mill-Branch Warehouse, Office or Distributor. More and more companies are finding it pays to rely on Carpenter for fast delivery of a variety of specialty steels to meet day-to-day requirements. You can get immediate delivery of Matched Tool and Die Steels, Stainless Steels, and Special-Purpose Alloy grades from large local stocks. Call your nearest Carpenter Mill-Branch Warehouse, Office or Distributor, any time.

Carpenter STEEL

Matched Tool and Die Steels

The Carpenter Steel Company, 139 W. Bern St., Reading, Pa.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y. — "CARSTEELCO"

Mill-Branch Warehouses, Offices and Distributors in Principal U. S. Cities

TO GET MORE SIZES OUT OF A WAREHOUSE THAN YOU PUT IN...

Use These Waterbury Farrel "Experts"

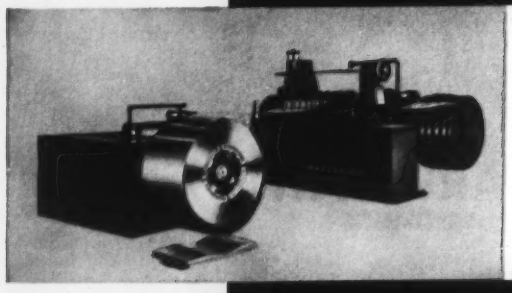
- **Available In Sizes To Fit Your Requirements**
- **Engineered For Efficient Low Maintenance Operation**

These WF units make your strip metal warehouse a streamlined production unit . . . able to produce specified sizes on the spot, from mill coils. You minimize storage space and inventory . . . step up deliveries . . . cut initial costs on shipping and packing . . . meet and beat competition.

Embodied in each piece of WF warehouse equipment is the up-to-date design and sound engineering which have built Waterbury Farrel's reputation in metal-working machinery since 1851.

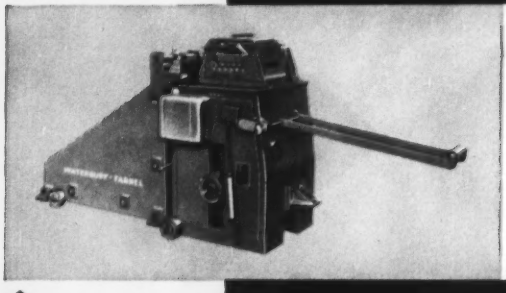
Write for further details on any of the units shown or mentioned here.

Eleven Roll Straightener. 1⅜" diameter x 14" face rolls. Upper rolls individually adjustable. Straighteners are available in a range of sizes with roll diameters and widths to meet varying requirements.



Gang slitting line consisting of payoff stand, coil lift, slitter and winder—built in various sizes to handle a wide range of gauges and widths.

Gang slitting machine arranged for slitting sheet stock—also available in several sizes.



Portable Roll Feed Straightener With Detachable Coil Box. Has variable speed drive and feed rolls on the front side. Nine 1¼"x 7" rolls. Other sizes available.

18" Motor-driven Cut off Saw for rods and tubes. Fully enclosed, including hinged saw guard.

WF-16

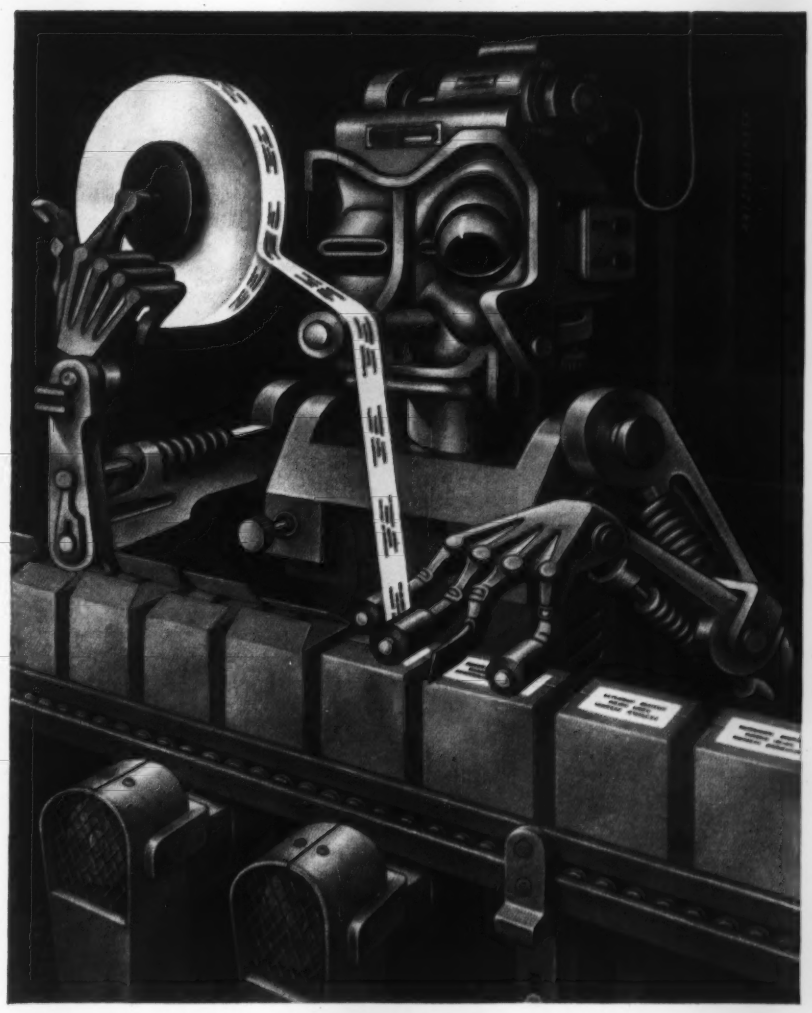
WEST COAST REPRESENTATIVE: Charles J. Paumier, 4757 East Slauson Avenue, Maywood, California

WATERBURY FARREL FOUNDRY & MACHINE CO. • WATERBURY, CONN.

Offices: Chicago, Cleveland and Millburn, N. J.

WATERBURY FARREL FOUNDED 1851

POWER PRESSES — Crank, Cam and Toggle; also Rack and Pinion Presses • Eyelet Machines • Multiple Plunger Presses • Horizontal and Hydraulic Presses, etc. **MILL MACHINERY** — Rolling Mills: Strip, Rod, Wire Flattening, (For Ferrous and Non Ferrous Metals) • Also Slitters • Straighteners • Cut-off Saws • Coilers • Winders, etc. **WIRE MILL EQUIPMENT** — Continuous Wire Drawing Machines (Upright Cone and Tandem) • Wire Flattening Mills • Chain Draw Benches • Pointers • Swagers • Bull Blocks • String-up Machines • Spoolers, etc. **COLD PROCESS BOLT & NUT MACHINERY** — Headers (all types) • Rivet Machinery • Trimmers • Thread Rolling Machines • Slotters • Nut Formers and Tappers, etc.



AUTOMATION? you name it...we'll tape it!

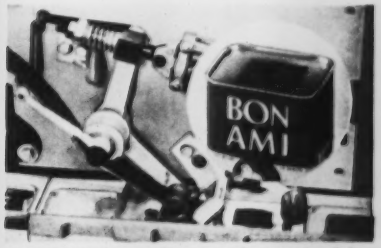
The trend in industrial production is toward *automation* . . . and tape application is no exception. There are more than 75 different types of manual, semi-automatic, and automatic dispensers for "Scotch" Brand Tapes. These basic types lend themselves to an infinite variety of adaptations. Chances are, wherever you use (or *could* use) tapes, we can provide a dispenser that will enable you to enjoy cost-saving, production-speeding benefits.

PRODUCT OF 3M RESEARCH **DISPENSERS**... *to speed the application of the more than 300 pressure-sensitive tapes for industry, trademarked . . .*

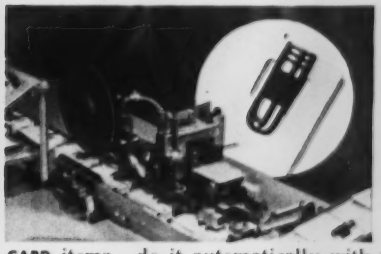
REG. U. S. PAT. OFF.

SCOTCH BRAND

Look what you can do with dispensers!



FLAT-SURFACE applicator, dramatized by Artzybasheff at left, automatically applies predetermined lengths of tape to moving objects at production-line speeds of better than a unit a second.



CARD items – do it automatically with "Scotch" Brand Tape. Here, tubes and pre-printed cards are brought into position in "tape stapler"; printed, transparent, or colored tape automatically locks tube and card together.

COMBINE two or more same-size packages automatically with "Scotch" Brand Tape and "Scotch" Package Bundler S-69. Handles up to 75 combinations a minute; special cut-off synchronizer available for printed tapes.

SEND FOR free folder describing automatic, semi-automatic, and manual "Scotch" Brand Dispensers for production, packaging, and assembly. Write on your letterhead to 3M Co., Dept. GK-106.

The term "Scotch" is a registered trademark of Minnesota Mining and Manufacturing Co., St. Paul 6, Minn. Export Sales Office: 99 Park Ave., New York 16, N.Y. In Canada: P.O. Box 757, London, Ontario.

© 3M Co., 1956

Republic

The HOK-1 is a four-place, twin intermeshing rotor machine powered by a Pratt & Whitney R-1340 nine-cylinder, air-cooled engine.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

Titanium saves weight . . . cuts cost in the Navy's HOK-1

The HOK-1 is a general utility, high performance helicopter manufactured by Kaman Aircraft Corporation, Bloomfield, Connecticut.

A weight-cost formula developed by Kaman engineers and used in combination with Titanium has resulted in substantial savings in the production of the HOK-1.

In the photo at left, a Kaman assembler is shown fastening sections of the firewall between pilot and engine compartments. These sections are fabricated from .016 gage Republic Titanium, Type RS-70 Annealed. This type has good forming qualities and a minimum tensile strength of 80,000 psi.

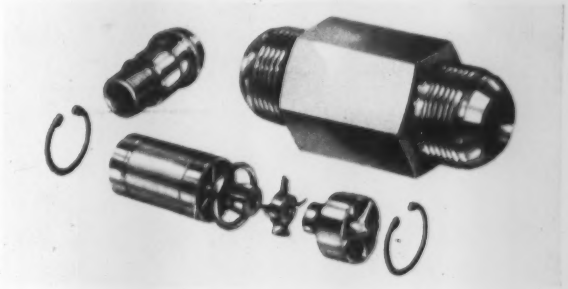
The high strength and lightweight advantages of Republic Titanium are adding range, speed and maneuverability to both military and commercial aircraft. These characteristics—plus Titanium's extremely high resistance to most forms of corrosion—are also being used to advantage in non-military applications such as, chemical equipment, heat exchangers, dehydration trays, anodizing racks and food-processing equipment.

Republic, world's largest producer of alloy and stainless steels, and pioneer in high strength-to-weight metals, offers you years of experience gained through helping hundreds of manufacturers design and redesign their products to get more strength with less weight at less cost.

This experience is available to you for your design and development work without cost or obligation. Just send the coupon or call your local Republic Sales Office.

ALLOY STEELS are vital in meeting today's demands for speed and light weight. They provide the highest strength values—plus an exceptionally high strength-to-weight ratio that permits transmission of thousands of horsepower through tough, strong gears and shafts free from excess weight. Republic will help you apply these fine steels to insure safety, extend equipment life and reduce maintenance and replacement costs.

OTHER REPUBLIC PRODUCTS FOR THE AIRCRAFT INDUSTRY



ENDURO STAINLESS STEEL, because of its resistance to corrosion, is used for bearings, housing and rotor in this turbine flow meter made by Fischer & Porter Co., Hatboro, Pa. This delicate instrument measures precise flow rate in testing jet fuels. The slightest trace of corrosion would impair its accuracy. ENDURO Stainless Steel helps maintain an accuracy of ±½%. Republic produces ENDURO in all commercial forms.

REPUBLIC STEEL CORPORATION
Dept. C-1885
3120 East 45th Street • Cleveland 27, Ohio

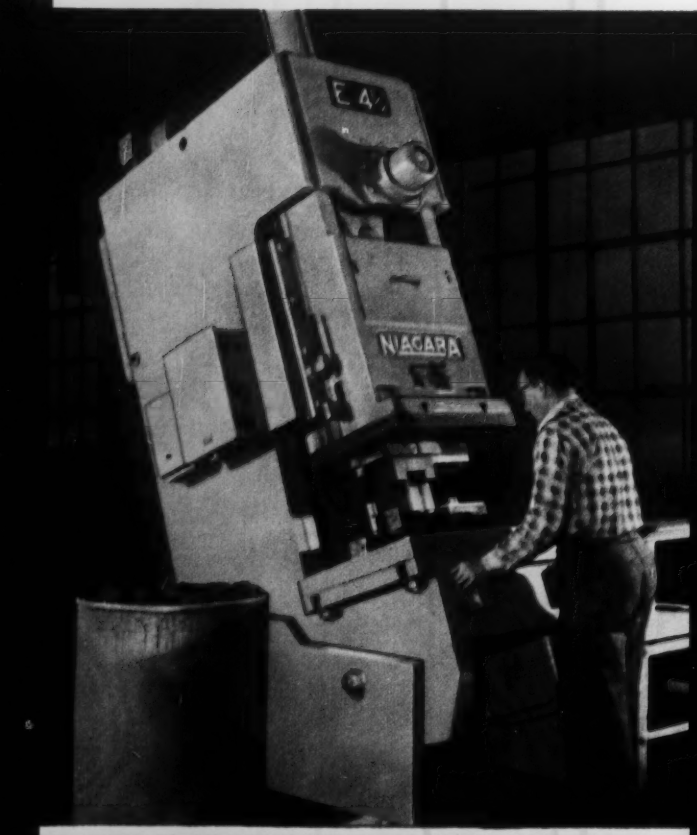
Please send more information on:
☐ Titanium ☐ Alloy Steel
☐ ENDURO® Stainless Steel

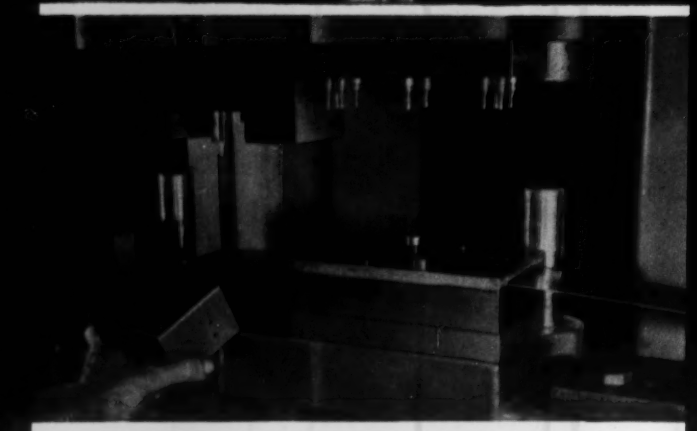
Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State_____

STEEL
and Steel Products

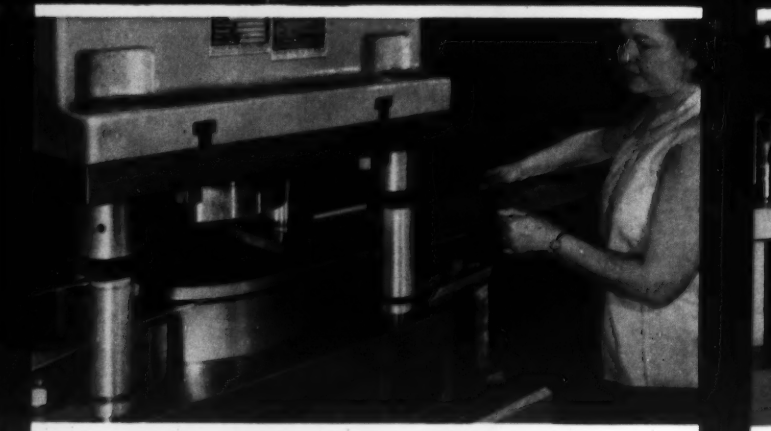
Take it from the early birds...

"IT'S THE GREATEST





Niagara Series E 4½ OBI Press in operation at a well known eastern commercial stamping plant. Work includes stamping small wrenches; trimming canopies for electrical fixtures; piercing, cutting off and forming saddles with a progressive die (shown).



Niagara Series E 4½ OBI Press engaged in blanking and drawing of kitchen cannister lids from half-hard aluminum at midwestern housewares manufacturing plant.

"we can produce from 8,000 to 10,000 pieces in an eight hour day"

"much safer press"

"takes less floor space"

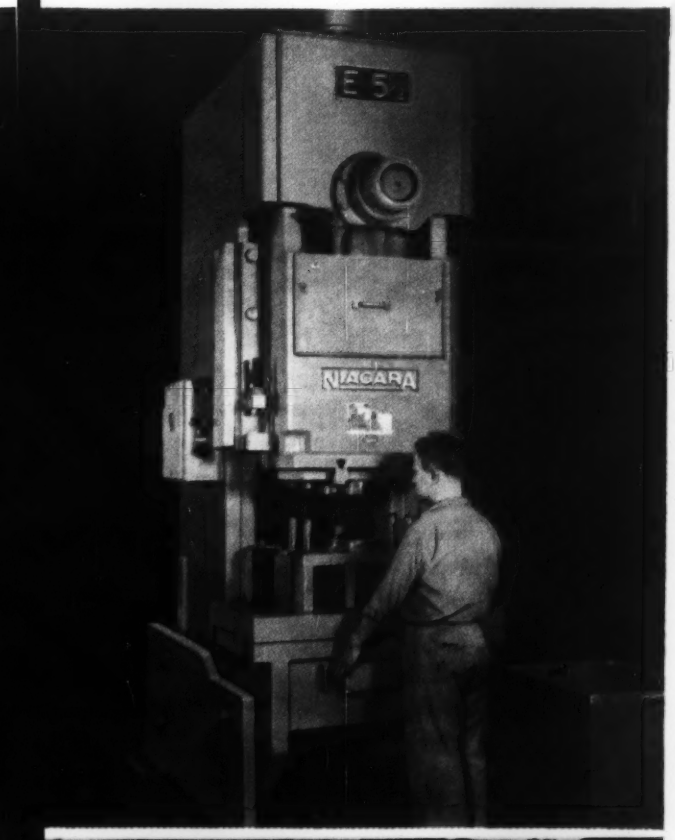
"has a centralized pressure lubricator which we like very much"

O.B.I. EVER BUILT"

"we find that dies without posts work much better on this press"

"all dies give better and longer runs"

"large slide area for large trimming, blanking and progressive dies"



Niagara Series E 5½ OBI Press forming and trimming hemispherical copper parts for one of the "Big Two" electrical manufacturers.

Few developments in metalworking history have drawn the enthusiastic endorsement given Niagara's revolutionary Front-to-Back Crankshaft OBI Press.

Now, as at the 1955 Machine Tool Show where it was unveiled, there is *nothing* even remotely resembling it in the industry... design-wise and production-wise.

Customers in U.S. and Canada... the "early birds" who are doing their modernizing with the most modern press of all... can today tell you about accomplishments with this newest and greatest of OBIs that you would have never dreamed possible. Yes, the press that Niagara conceived to do more than any OBI ever built is doing just that for a fast-growing list of metalworking plants.

There's a huge fund of successful experiences that a Niagara representative can share with you today. Draw on it now and utilize it in your modernization plans. Make a date, at your convenience, for a personal call.

...and if you haven't received new Bulletin 56 with complete design description and specifications (75-200 ton capacities, 4½-7½ inch shaft diameters, standard and automated models) write for your copy at once. You will find it invaluable to your planning.

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N.Y.

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Buffalo • Cleveland • Detroit • Indianapolis • New York • Philadelphia

Distributors in principal U. S. cities and major foreign countries

•

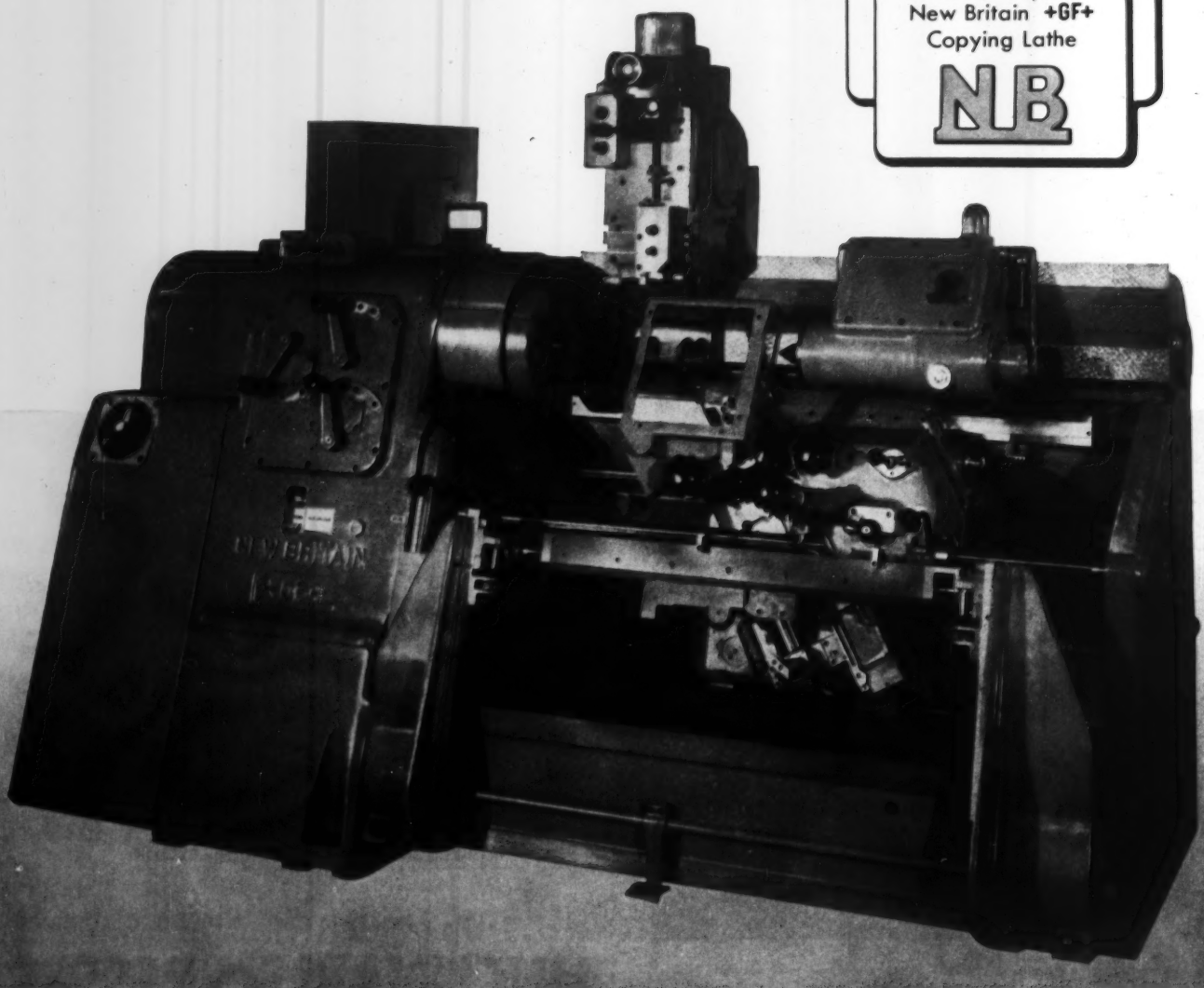
America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work

NIAGARA

front-to-back crankshaft INCLINABLE PRESSES

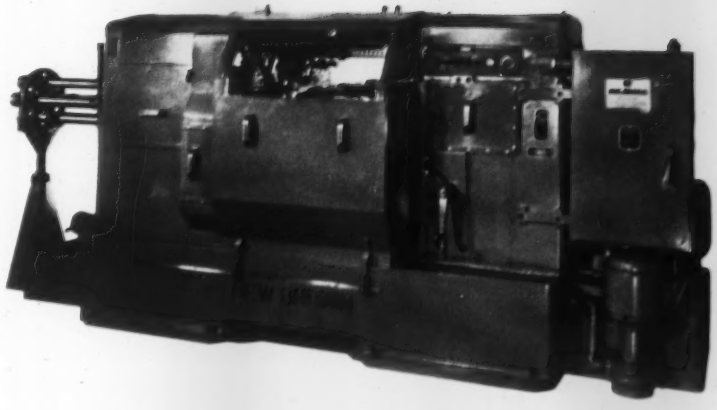
investigate a brand new approach to turning

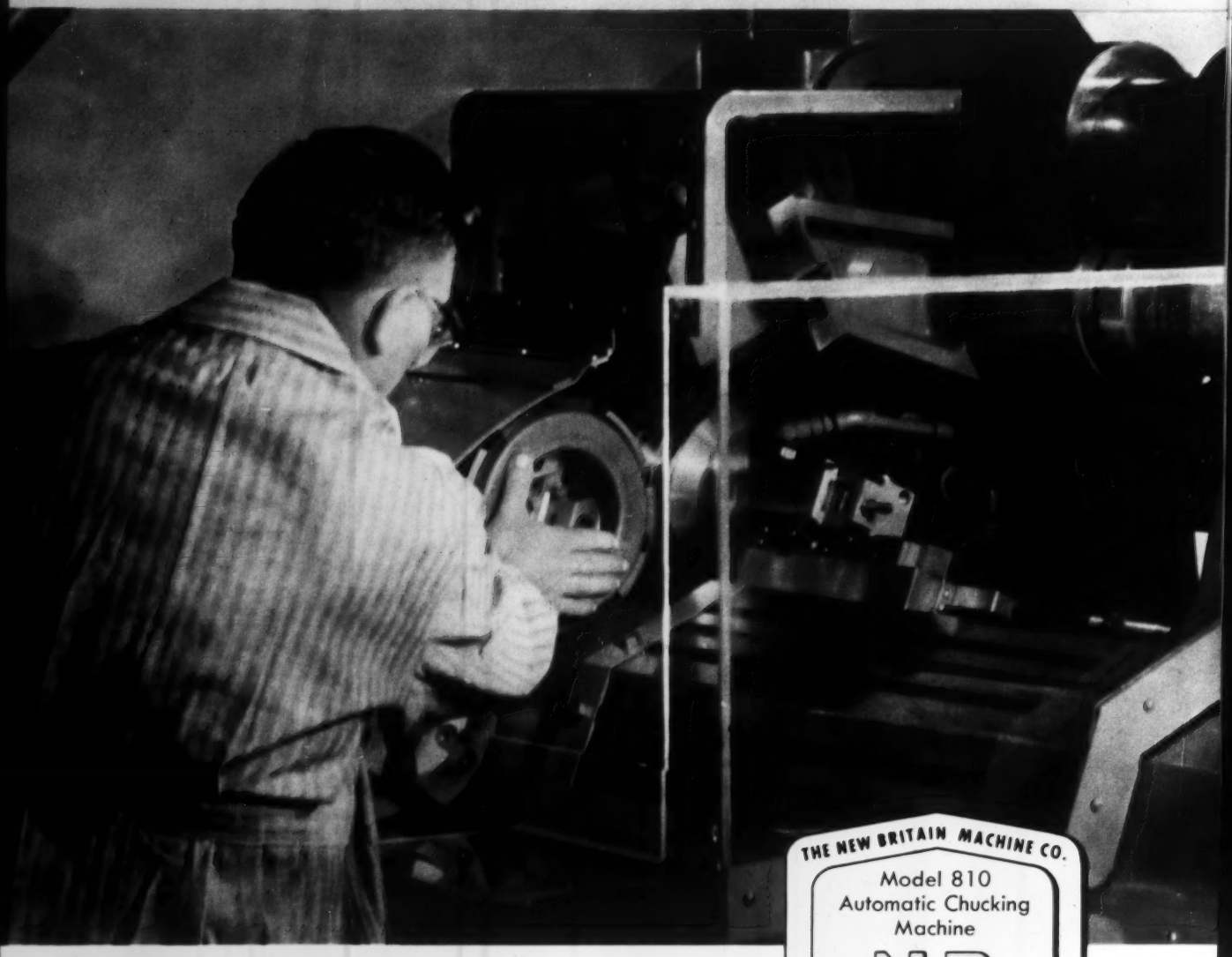
On this New Britain +GF+ Copying Lathe, you can make an accurate first piece from a blueprint—then *copy* it accurately a million times if your requirements call for it. New Britain can supply automatic loading too, if it makes sense on your work. Let us give you the complete story of this new contour approach to turning in a color motion picture demonstration in your office. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.



8 tons of metalworking efficiency

If you are interested in absolute minimum cost per piece on either long or short runs, investigate the Model 601 New Britain bar machine. Massive enough and powerful enough to handle your new high-speed cutting requirements. Super-high spindle speeds, maximum versatility, optional universal tool slide cam which eliminates cam change time. With the Model 601 on your floor you have "the shortest distance" between bar stock and finished piece. Write for Bulletin 6H.



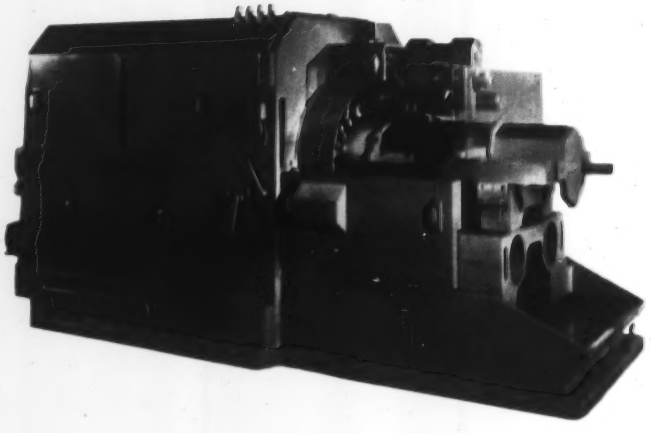


new New Britain chuckers handle bigger work pieces

If you know chucking machines you know the world-wide reputation of New Britains for accessibility, versatility, quick setup and sustained high production of precision parts.

Now new New Britain models enable you to apply this high productivity to pieces with chucking diameters up to ten inches on eight-spindle machines, twelve inches on six-spindle production and fifteen inches on four-spindle work.

Check this practical approach to more profitable production with your New Britain representative, or write for Bulletin 3R. The New Britain-Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.

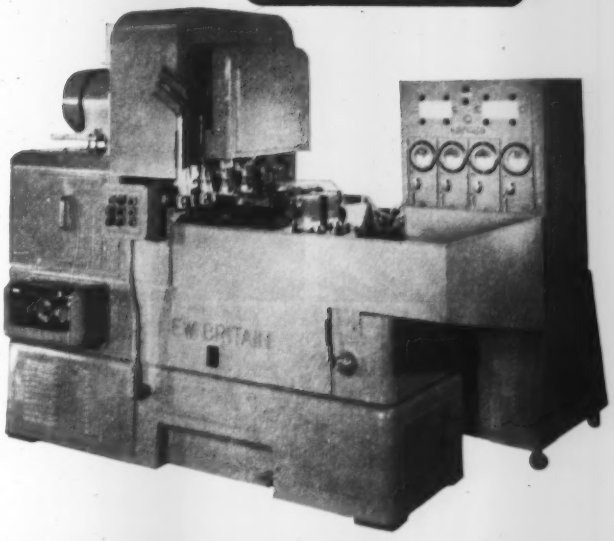


here's fully automatic precision turning and boring

This Model 37 New Britain is a down-to-earth money-making application of automated machining—made practical by automatic loading, *plus* high-spindle speeds, *plus* multiple-spindle production, *plus* automatic gauging, *plus* automatic close adjustment of each tool.

These modern machines, with or without automatic controls, will enable you to make simple work of tough jobs involving such operations as step turning, step boring, boring and facing, turning and facing, grooving, recessing, chamfering or generating contours.

Available in a complete line of horizontal, vertical and double-end models.



READY

SURFACE COMBUSTION CORPORATION, 2408 DORR ST., TOLEDO 1, OHIO

TO ROLL

New batteries of Surface® one-way fired soaking pits go into operation in Texas, where men make big investments and expect big returns

Associated Companies:
British Furnaces, Ltd., Chesterfield
Stein & Atkinson, Ltd., London • Stein & Roubaix, Paris
S. A. Belge, Stein & Roubaix, Bressoux, Liege
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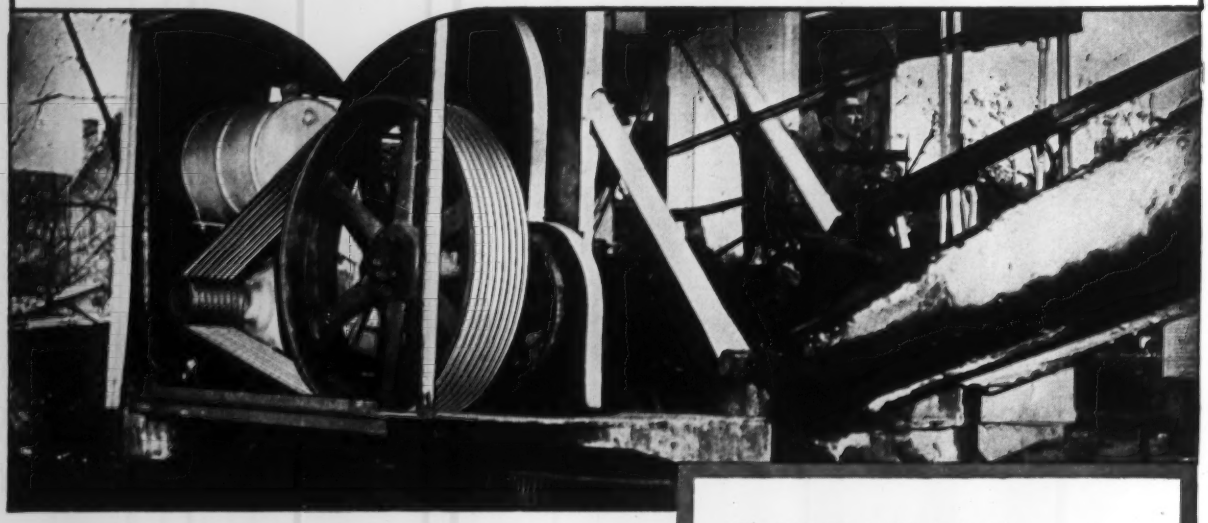
Surface
STEEL MILL EQUIPMENT

These super-tough V-belts saved construction firm $1,600 first year



How Gates Super Vulco Rope solves tough drive problems

Wherever . . . whenever . . . you have a tough drive problem—the problem of handling shock loads, of overcoming heat and weather, or of limited space—have one of our belt specialists show you how the problem can be solved with a Gates Super Vulco Rope Drive.

For example: Bise & Shortt, General Contractors, of Clintwood, Virginia, had a chain drive on their one-yard power shovel shown above.

After six months of use, the worn chain would whip under load, causing both chain and sprocket to wear out still more rapidly. New chain had to be installed every year.

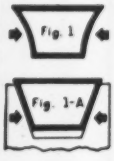
Then Ayers Shortt called in a Gates engineer to solve the problem. With space limited and severe shock-loads a factor, the Gates man recommended a Gates Super Vulco Rope Drive for lowest initial cost and continuing economy. "The shovel runs like new," says Mr. Shortt, "and every year the Gates drive is saving us the $1,600 it cost in parts and lost time to replace the chain drive."

Gates offices and distributors are listed in phone book yellow pages in all major industrial centers. The Gates Rubber Company., Denver, Colorado—*World's Largest Maker of V-Belts.*

No Other V-Belt has ALL these Advantages

1. Tough, resilient Tensile Cords

Super-strength tensile cords provide 40 % greater horsepower capacity . . . easily absorb heavy shock loads . . . reduce number of belts required . . . save weight and space.



2. Concave Sidewalls (US Pat. 1813698)

Concave sides (Fig. 1) increase belt life. As belt bends, concave sidewalls become straight, making uniform contact with sheave groove (Fig. 1-A). Uniform contact means less wear on sides of belt . . . far longer belt life.

3. Flex-Weave Cover (US Pat. 2519590)

Provides greater flexibility with far less stress on fabric. Cover wears longer . . . increases belt life . . . more power available to driven machine.

4. High Electrical Conductivity

Built into Gates Super Vulco Ropes for safer drives (in explosive atmospheres).

5. Oil, Heat, Weather Resistant

Special rubber compounds make Super Vulco Ropes highly resistant to heat, oil, and prolonged exposure.

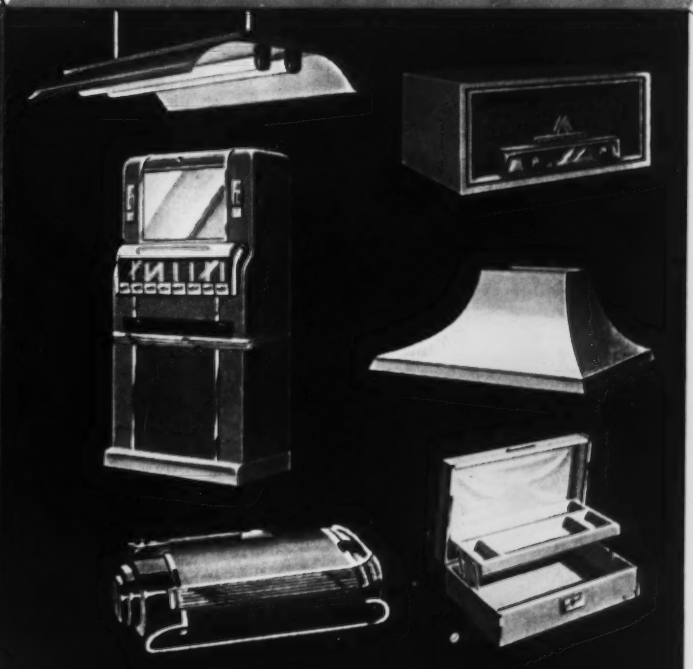
The Mark of Gates Specialized Research

TPA 117

Gates SUPER VULCO ROPE Drives

Weirzin's tightly bonded zinc coating takes the deepest draws with ease—does not crack, peel or flake under the severest fabricating operations.

Weirzin's malleable zinc coating lubricates dies without leaving a zinc deposit—reduces die maintenance—increases die life.



Weirzin, chemically treated, takes and holds paint, enamel, lacquer and lithographic ink indefinitely—eliminates underfilm corrosion.

Weirzin stops inventory losses due to rust—eliminates pickling—reduces cleaning and buffing—cuts handling before, during and after fabrication.

How to wrap up product superiority...at lower cost

Weirzin

electrolytic zinc-coated sheet

No matter how extreme the stresses of fabricating operations, electrolytic zinc-coated Weirzin stands up under them. Its tightly bonded malleable coating flows so smoothly with the ductile steel base during a deep draw that Weirzin seldom needs additional coating for corrosion protection.

Here is a different kind of steel sheet. For ease of fabricating, for durability, for long-range economy, no other "similar" metal measures up to Weirzin. Weirzin is produced in a continuous strip up to 36" wide. It is available in coils or cut lengths down to ½" strip—gauges .010 to .0478. Phone or write now for the money-saving, customer-pleasing facts about Weirzin!

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

a division of

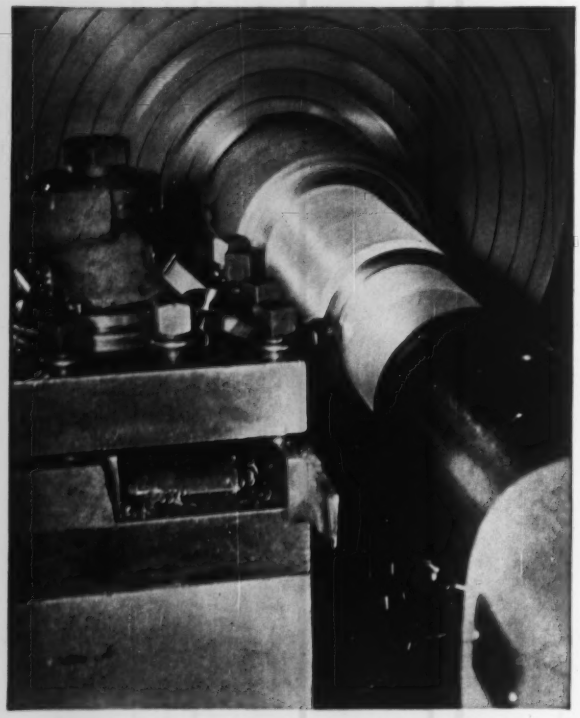
NATIONAL STEEL CORPORATION

(Advertisement)

More production for your tooling dollar is the reason...

WHY IT PAYS TO SPEND FOR CARBOLOY EXTRA—

If you rely on "Equivalent Grade" Charts to save a few tooling pennies, these facts on carbide costs may save you thousands of production dollars



TESTS ON STAINLESS STEEL VANED ROLLS by a New Hampshire pulp and paper-processing equipment manufacturer demonstrate how the "Equivalent Grade" Charts hide tremendous differences in carbides' production abilities. With Grade "X," production per tool was limited to two pieces per grind. Machine speed had to be held down to protect the carbide.

Switching to Grade 370 brought the manufacturer 8 to 9 pieces per grind. Machine speeds were doubled; 14 hours a day in labor were saved. Result: savings of more than $100 a week, in addition to lower downtime, grinding, and inventory costs.

SO-CALLED "Equivalent Grade" Charts hide the fact that no two carbide grades will produce the same results. Because they classify carbides by broad areas of application, the Charts ignore important differences in production ability.

Thus, they mislead buyers into believing they can safely purchase the cheapest grade listed for a job.

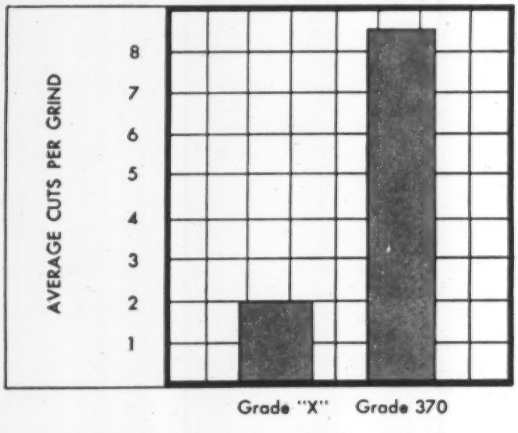
But actual tool-comparison tests have proved conclusively that the production abilities of carbides *do* vary tremendously. Moreover . . . these tests show that the pennies saved by buying on low initial cost often lead to thousands of wasted dollars . . . in lost production, lower machine efficiency, non-productive man-hours. .

The case history at left is one of hundreds demonstrating why cost per finished piece – not initial cost – is the only reliable guide to buying carbides.

Results of an actual comparison test

According to the "Equivalent Grade" Charts, any one of several carbide grades could handle the job of machining these rolls. The manufacturer tried Grade "X" first – because it cost 10% less, initially, than Carboloy* Extra-Performance Grade 370.

Grade "X," however, machined only two rolls per day. Grade 370 increased production to 8 or 9 pieces per day (Graph No. 1).

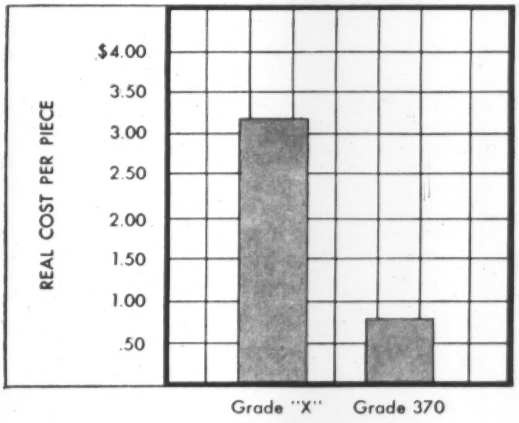


Graph No. 1—Production Ability Comparisons

A FEW CENTS MORE PERFORMANCE CARBIDES

When the *real* cost of the tools was calculated, the manufacturer found the initial saving with Grade "X" was actually *making* him *lose* more than $100 a week. Here's why:

The real cost of Grade "X" was $3.18 per piece machined (2 pieces from a $6.37 tool). The real cost of Grade 370 is just $.82 (average of 8½ pieces from a $7.01 tool). On the weekly production of 42-43 rolls, the saving totals $100.30!



Graph No. 2—Real Cost Comparisons

Yet even this eye-opening figure does not tell the whole story. The Grade 370 tool operated at twice the speed of Grade "X." It helped save the manufacturer 14 hours a day in labor. It provided twice the tool life. It eliminated a special finishing tool.

When these facts were translated into dollars and cents, the manufacturer found that downtime costs were reduced, because the tool remained on the job longer. Grinding costs were reduced, because the tool required less maintenance. Inventory costs were reduced, because a few tools did the work of many.

When added up, these amounted to a considerable saving—yet nothing in the "Equivalent Grade" Charts could have forecast it. These are savings which buying on the basis of initial cost always obscures. These are savings which more than justify spending a few cents more for carbides with extra production ability.

Carboloy Extra-Performance Carbides available for all steel-cutting jobs

Heavy-Duty Grade 370, used in the test above, is one of three Carboloy Extra-Performance Carbides. Together with Medium-Duty Grade 350 and Finishing Grade 330, these grades cover the entire steel-cutting range from roughing to finishing.

Extra-Performance Grades 330, 350, and 370 cost more, initially, because they are made by a unique and more costly process. But their performance so far exceeds conventional carbides that there are actually no "equivalent" grades for any of them. They cannot be fitted into the arbitrarily selected cubbyholes on the "Equivalent Grade" Charts now in common use.

These Extra-Performance Grades easily expose the fallacy of the "Equivalent Grade" Charts, because they are so superior to other steel-cutting grades. But even when attempting to classify conventional grades, the Charts exhibit the same fatal flaw.

Because there is no way of knowing in advance how any grade will perform on the job, we make this suggestion: Always run your own comparison tests *before* you specify a grade. When the results are in, you will find that one grade will bring your plant significant savings in tool costs, machining and labor expense.

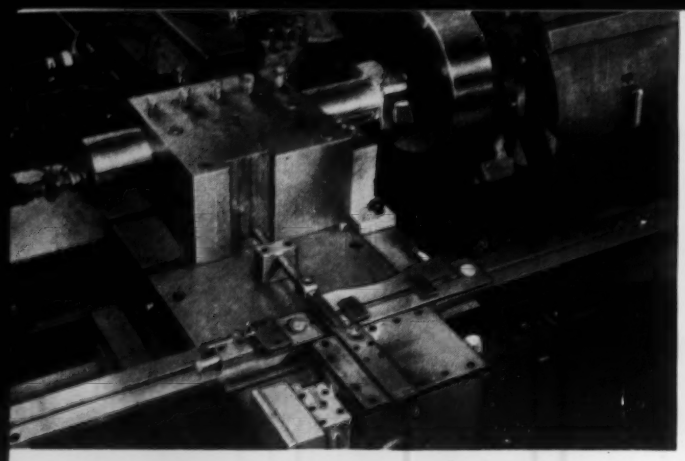
We think you will find *that grade* will be one of the Carboloy Extra-Performance Carbides. But whatever it is, specify it *by name*. Do not settle for an "equivalent" grade.

If you would like a more detailed discussion of the whole problem of Initial Costs vs. Real Costs, and the fallacies of the so-called "Equivalent Grade" Charts, write today for a sales engineer to call on you. Send your request to: *Metallurgical Products Department of General Electric Company, 11141 E. 8 Mile Ave., Detroit 32, Michigan.*

CARBOLOY

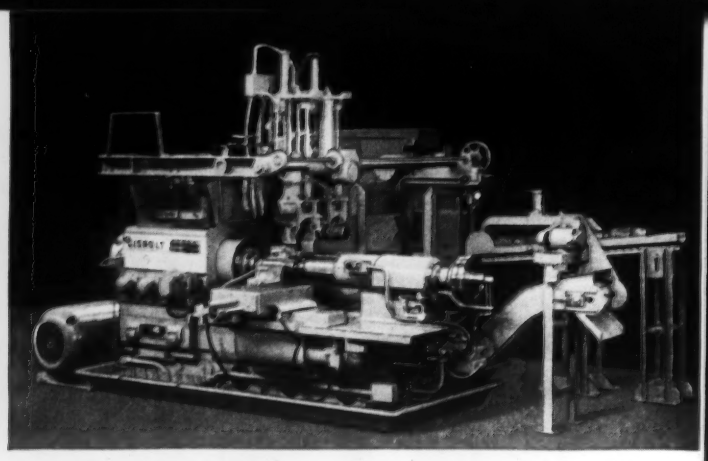
CEMENTED CARBIDES

*CARBOLOY IS A TRADEMARK OF GENERAL ELECTRIC COMPANY



NO. 24—WITH CHUCK

Ninety pounds of tough bearing steel are removed in two 8-minute operations on this job. One No. 24 handles six types and 24 different sizes of inner and outer bearing races with ease and efficiency. A JETracer on the rear independent slide simplifies spherical, straight and taper boring operations—also improves accuracy and finish and lowers unit costs.



NO. 24—ON TAILSTOCK-SUPPORTED EXPANDING ARBOR

Automatic loading and unloading are part of the machining cycle on this setup. Utilizing overhead clamps and a traversing carriage arrangement, the No. 24 makes fast work of these tough steel tool joint forgings. The operator has separate push-button control over all machine and handling functions for faster, easier setups and change-overs.

YOU CAN REDUCE COSTS ON

NEW GISHOLT MASTERLINE NO. 24

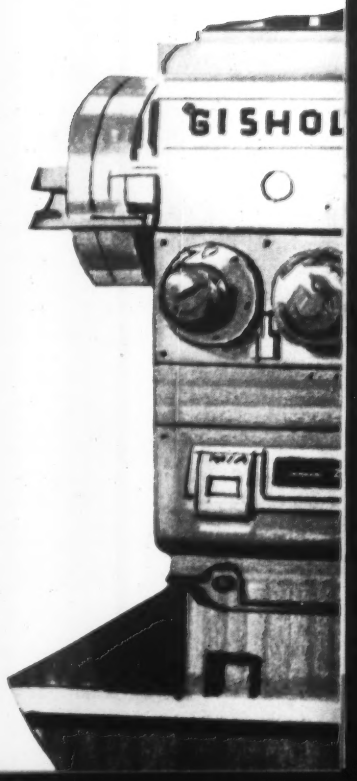
WHETHER YOUR LARGE PART PRODUCTION INVOLVES long, steady runs or small repeat lots, you'll find definite ways to cut costs with this new Gisholt MASTERLINE No. 24 Automatic Production Lathe.

And you can realize these savings whether your work has to be held on an arbor, in a chuck or special fixture, or between-centers with work driver and tailstock—for the big No. 24 will handle parts all four ways.

Cost cutting with this extra powerful (up to 125 h.p.) single-spindle automatic is inherent within its standard automatic cycle. Hydraulic control of all carriage and auxiliary slide movements—plus automatic stopping and starting of the spindle—lets one operator handle two or more of these machines, or perform other jobs during machining time.

Still more savings are realized through faster, easier setup and shorter change-over periods. During setup, all hydraulic actuated movements may be manually controlled. Spindle speeds, feeds and stops are easily changed. This means you can produce a variety of large parts—or handle small repeats—without excessive down time between sizes or jobs.

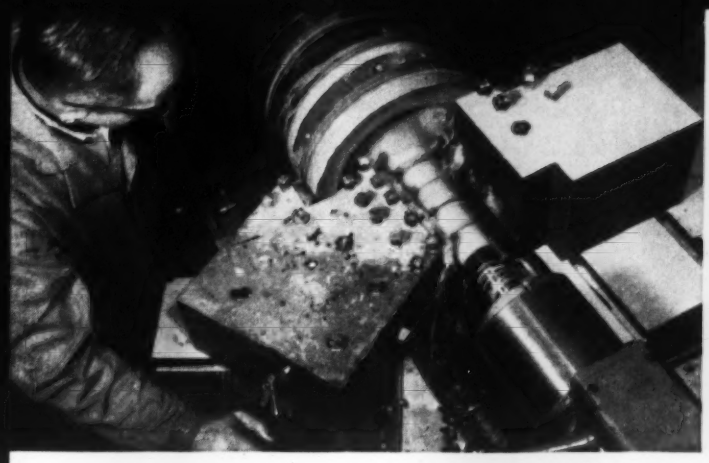
Whatever type of large part you are producing now—or planning for the future—your Gisholt Representative can show you how and where the No. 24 will produce it for less cost. Call him today—or write Gisholt for complete information.

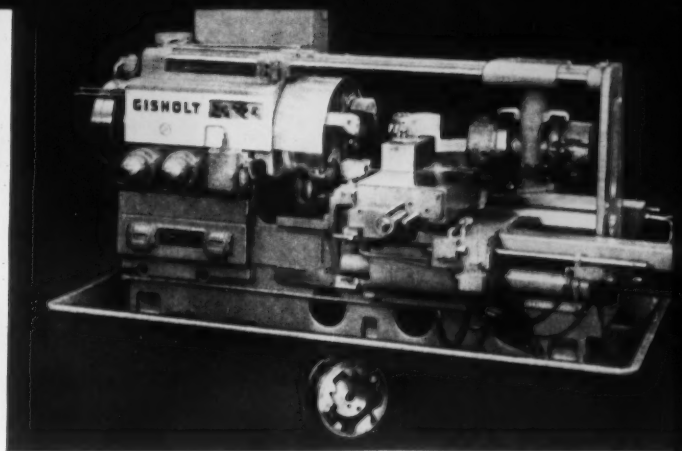


GISHOLT MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS





NO. 24—WITH CHUCK AND TAILSTOCK SUPPORT

With this setup, husky airplane drive gear and propeller shafts are completed in two fast operations on two No. 24's. One man handles both machines. The first operation is shown. Five diameters are machined plus turning, facing and chamfering. The second operation, on the other end, is similar. Floor-to-floor time: 12 min. per operation with 75 lb. of metal removed.

NO. 24—WITH CHUCK AND LOADING ARBOR

Here, standard tooling plus a unique, indexing-loading arbor arrangement on the No. 24 has cut costs and reduced effort in the machining of heavy cast iron diesel cylinder heads. Floor-to-floor time is only 1.2 minutes. More time is spent making chips because most of the loading-unloading operation is performed while the tools are working on the next part.

LARGE PART PRODUCTION WITH THE

AUTOMATIC PRODUCTION LATHE

(Advertisement)

SPECIAL REPORTS ON FINISHING NON-FERROUS METALS

NUMBER I—Decorative, Corrosion-Resistant Finishing with Iridite

Chromate conversion coatings are well known and accepted throughout industry as an economical means of providing corrosion protection, a decorative finish or a good paint base for non-ferrous metals. However, continued developments are so rapid and widespread that many manufacturers may not be completely aware of the breadth of application of this type of finish. Hence, this digest of current information; to bring you up to date on the many ways in which you can combine salable appearance with durability in one finish at a competitive price advantage. Report II on paint base, corrosion-resistant finishes and Report III on chemically polished, corrosion-resistant finishes are available on request.

First, as a basis for this discussion, a "decorative" finish is considered as any chromate film that is used as a final finish in itself. It may be truly decorative in that its sole purpose is to enhance the beauty of the product. For example, a bright chrome-like finish or a pleasing bronze appearance are among the many effects that can be obtained. It may be functionally decorative in that it reduces reflectivity for camouflage purposes or provides a means of color-coding parts. But, in all cases, the Iridite films protect the metal against corrosive attack.

Iridite finishes are now available for all commercial forms of the more commonly used non-ferrous metals, including zinc, cadmium, aluminum, magnesium, silver, copper, brass and bronze. These films can produce a wide variety of pleasing appearances. The basic colors of the Iridite coatings are grouped below by metals.

ZINC and CADMIUM: Metallic bright, light iridescent, iridescent yellow, bronze, olive drab.

COPPER, BRASS, BRONZE: Metallic bright, yellow.

ALUMINUM ALLOYS: Clear, iridescent yellow, brown.

MAGNESIUM ALLOYS: Metallic bright, iridescent yellow-red, brown.

SILVER: Metallic bright.

In addition, many films can be modified by bleaching or by dyeing. Among the dye colors available are various shades of red, yellow, green, blue or black.

Depending upon the metal and the Iridite used, corrosion resistance of clear and bright films ranges from mild passivity to as high as 500 hours in salt-spray; on heavier dark films, salt-spray resistance ranges from approximately 100 to 1000 hours.

It is this combination of decorative and corrosion resistant properties that accounts for the widening use of Iridite finishes. For example, Iridites #4-73 and #4-75 (Cast-Zinc-Brite) make possible for the first time, a combination of lustrous chemical polishing of the as-cast surface of zinc die castings and good resistance to corrosion. Further, in many cases, sizeable savings in the cost of buffing and electroplating are realized.

WHAT IS IRIDITE®

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002" max.) gel-like, complex chromate film of a non-porous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

On many steel parts, a simple system of zinc or cadmium plate and bright Iridite is used instead of more costly electroplated finishes to provide a bright, decorative and protective finish with tremendous savings in material, equipment and labor.

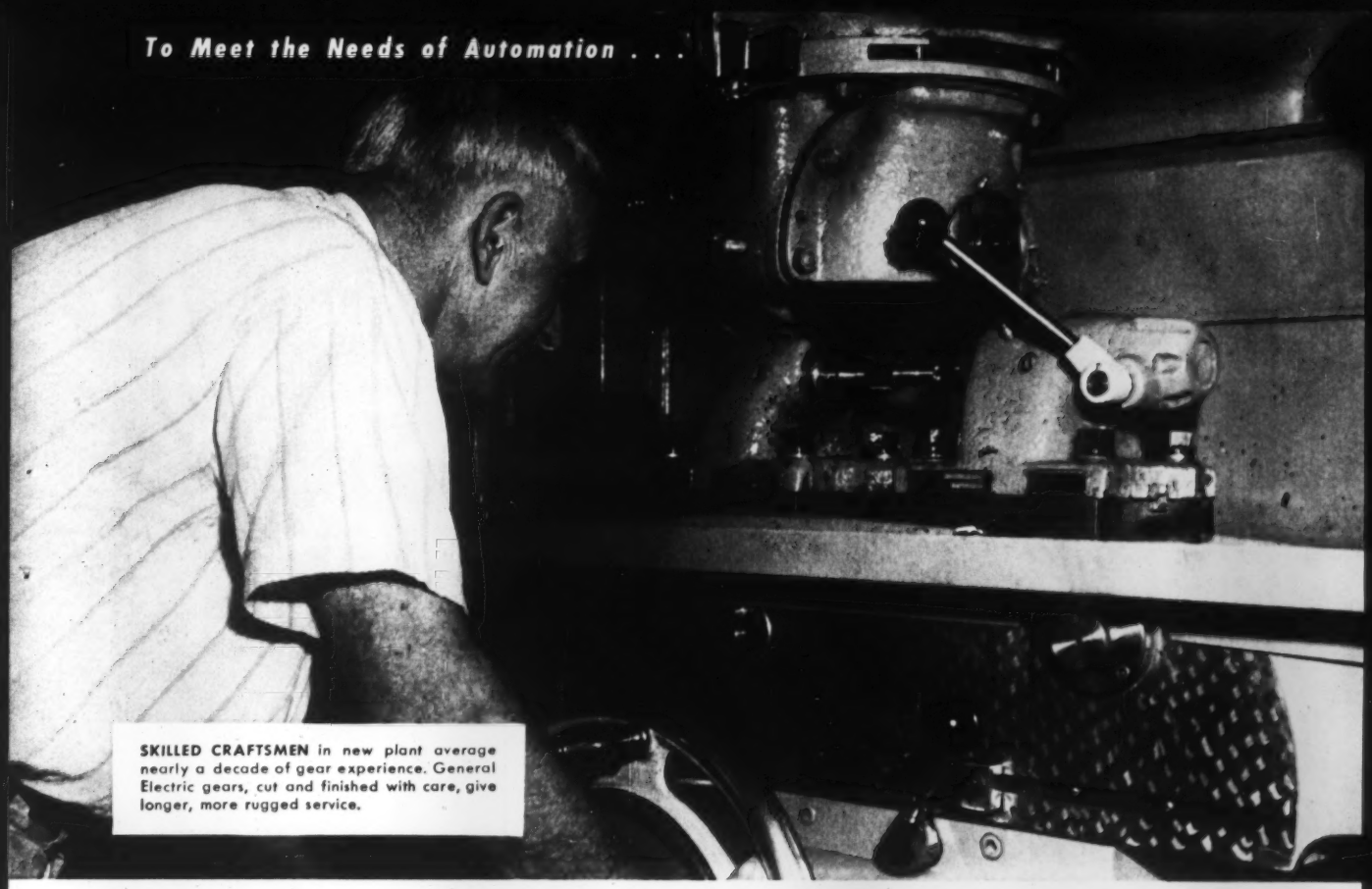
In finishing aluminum, where corrosion resistance or paint adherence is the prime consideration, the aircraft industry has all but abandoned the anodizing process in favor of recently developed chromate conversion coatings, among them Iridite #14 and #14-2 (Al-Coat). These formulations and their method of application can be varied to retain the original metallic appearance while providing acceptable corrosion resistance, or to produce a fully colored brown finish that offers exceptional corrosion protection. Again, time and manpower savings are astounding—one company saved at least $15,000 a year on maintenance of racks alone and another $40,000 on materials and labor in only nine months. In addition, of course, hundreds of thousands of dollars are saved by eliminating the need for expenditures for generators, heating equipment and racks.

Iridites are widely approved under both Armed Services and industrial specifications because of performance, low cost and savings of materials and equipment.

In planning or designing, you should consider the many other characteristics of Iridite finishes which may enter into the specific problem. In addition to having decorative and protective functions, these chromate coatings form an excellent base for organic finishes and bonding compounds. They have low electrical resistance. Some can be soldered and welded. The Iridite film itself does not affect the dimensional stability of close tolerance parts.

You can see then, that with the many factors to be considered, selection of the Iridite best suited to your product requires the services of a specialist. That's why Allied maintains a staff of competent Field Engineers—to help you select the Iridite to make your installation most efficient in improving the quality of your product. You'll find your Allied Field Engineer listed under "Plating Supplies" in your classified telephone book. Or, write direct and tell us your problem. Complete literature and data, as well as sample part processing, is available. Allied Research Products, Inc., 4004-06 E. Monument Street, Baltimore 5, Maryland.

To Meet the Needs of Automation . . .



SKILLED CRAFTSMEN in new plant average nearly a decade of gear experience. General Electric gears, cut and finished with care, give longer, more rugged service.

At General Electric's NEW Gear Motor and Transmission Components Department . . .

3618 man-years of manufacturing know-how assure fast service on low-speed drives

To meet the increased demand for low-speed drives, General Electric's new decentralized Gear Motor and Transmission Components Department will be devoted solely to the design and manufacture of mechanical power transmissions.

•Specialized Attention—Highly trained and experienced gear-motor engineers and skilled craftsmen with over 3600 man-years of experience are available to help solve your low-speed drive problems. They are ready to give you fast, dependable G-E service on standards, on specials, and on new gear-motor products.

•Complete Line Available—General Electric offers a complete line of gear-motors—induction, synchronous, wound rotor, d-c gear-motors—in all types and enclosures, from 1/100 to 200 hp. The new department will also give you rapid service on special needs such as adjustable speed, braking, special mounting or special insulation.

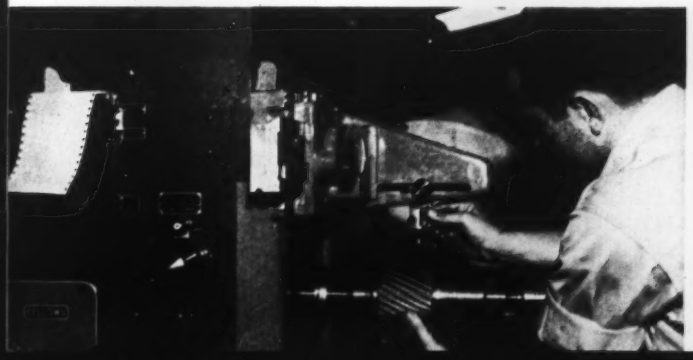
•Fast Service—The expanded gear-motor facilities allow quantity production and shorter manufacturing cycles. Machine tools in the new factory are designed for high volume precision work and are readily adaptable for the production of specials built to your specifications.

•For More Information—Write for bulletin GEA-6027, Section 851 2, Schenectady, N. Y., or contact your G-E Apparatus Sales Office or gear-motor supplier. Gear Motor and Transmission Components Department, General Electric Co., Paterson, N. J.

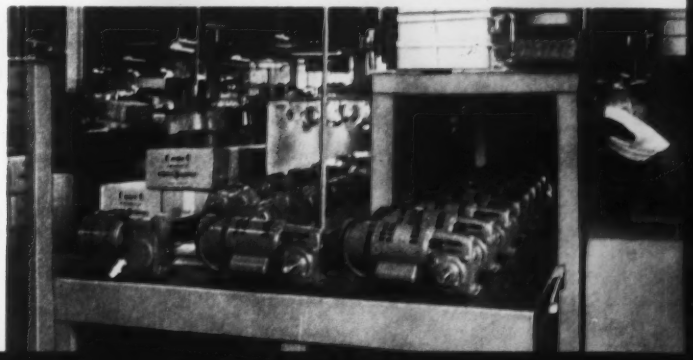
Progress Is Our Most Important Product

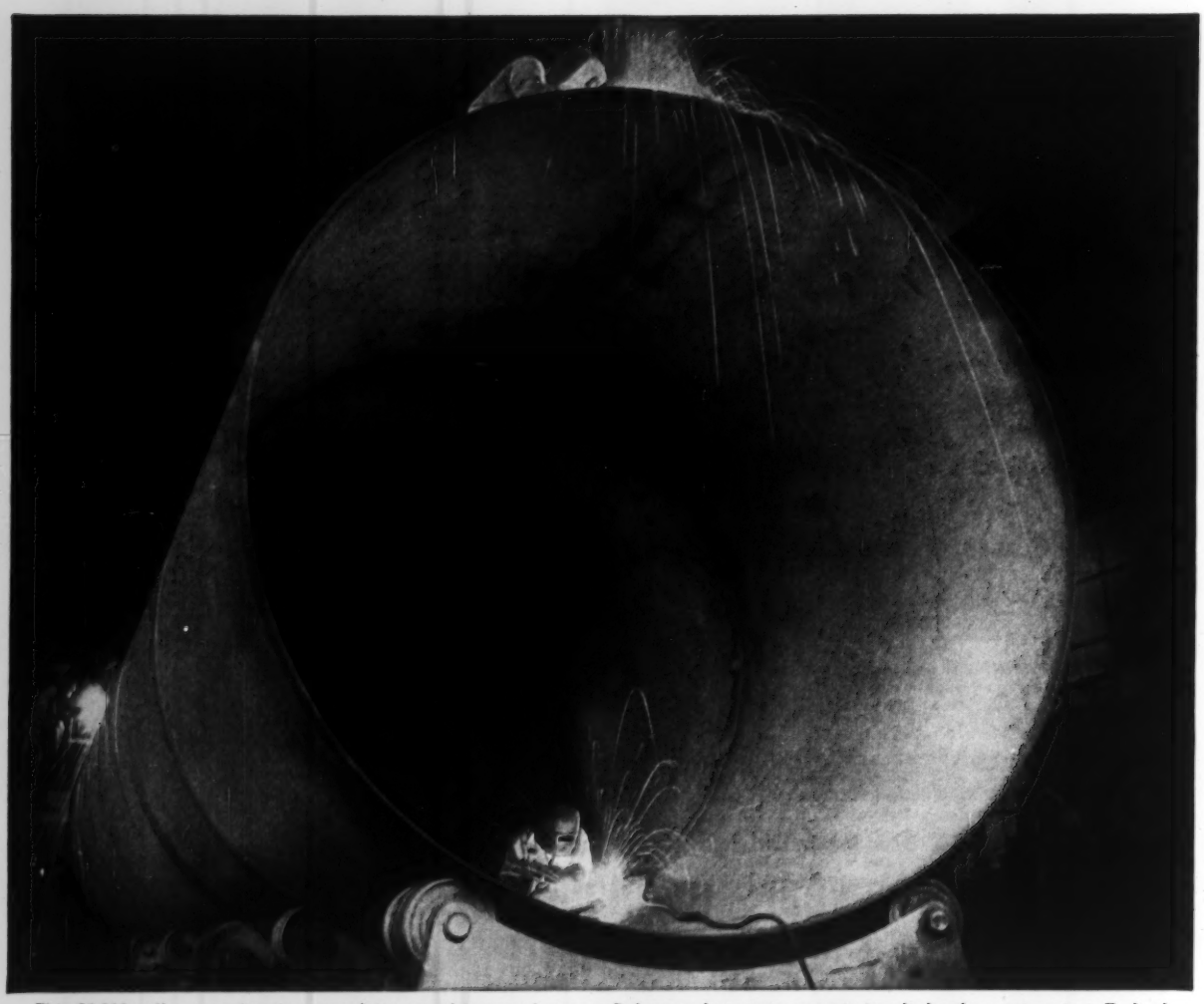
GENERAL ELECTRIC

CONTINUOUS TESTING provides data for quality control, new designs and developments. Here, an involute measuring instrument records wear, under simulated tortuous conditions, to nearest ten-thousandths of an inch.



QUANTITY PRODUCTION of complete line of G-E gear-motors from 1/100 to 200 hp, in all types and enclosures, assures prompt customer service. Specify General Electric for all your low-speed drive needs.





This 50,000 gallon capacity air accumulator vessel is one of many under construction by Allied Steel Products Corporation, Newport, Delaware, for a government aircraft development project. Each of the vessels is fabricated entirely of Lukens "T-1" steel.

Fabricator of giant air accumulator says:

"LUKENS HIGH YIELD STRENGTH 'T-1' WELDS EASIER THAN OTHER HIGH-STRENGTH STEELS!"

■ A strong statement—but Lukens "T-1" steel is a remarkable new material. Reports from **Allied Steel Products** say it combines strength and toughness with excellent weldability—as found in no other alloy steel. On this project, every inch of weld was subjected to X-ray inspection.

The greater strength of Lukens "T-1" steel permits reduced plate thickness for a given pressure and vessel diameter. For example, this 11-foot inside diameter air accumulator's shell is only 1¼" thick, and the unit will be hydrostatically tested for a minimum working pressure of 585 psi. Operating temperatures will range from −20° to +125°.

Needless to say, Allied Steel Products looks forward to using Lukens "T-1" steel on other assignments in the very near future.

If your problem is equipment weight . . . abrasion, impact or atmospheric corrosion . . . the need for toughness at temperature extremes—it will pay you to investigate this amazing new alloy steel now.

For the latest in fabrication techniques and specifications, write to Manager, Marketing Service, 846 Lukens Building, Lukens Steel Company, Coatesville, Pennsylvania.

LUKENS "T-1" STEEL

LUKENS

THE NEWEST IN A COMPLETE LINE OF ALLOY STEELS
LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA

Carrier Corporation reports:

"Cleanouts extended from 4 to 10 weeks... fewer tests of solvent and less 'coking' on coils with TRICLENE® D"

TRICHLORETHYLENE

Carrier Corporation, Syracuse, N. Y., takes particular pains with the degreasing of its many-finned refrigeration and air conditioning condensers. Their quality and safety standards demand bright, thorough cleaning of the aluminum fins and copper tubing . . . no oil residue on the metal surfaces. To meet these high production standards, they use "Triclene" D as the solvent for their vapor degreasers.

Carrier reports: "The period between degreaser cleanouts has been extended from four to ten weeks." Further, there is "less 'coking' on coils and the necessity of constant checks of solvent pH is substantially reduced."

Heat, light, air, acids and aluminum chloride will not affect "Triclene" D with locked-in stabilizers. Yet this rugged solvent safely cleans even the most delicately machined surfaces... retains its original purity longer... gives brighter cleaning of metal, distillation after distillation. And it *costs* no more than ordinary solvents!

GET ALL THE FACTS on vapor degreasing. This new Du Pont book contains 42 pages of data, figures and illustrations . . . something on all the latest degreasing developments. A copy for your files will be sent to you without obligation—just clip and mail the coupon below.

TRICLENE® D

TRICHLORETHYLENE

DU PONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department S-10
Wilmington 98, Delaware

☐ Please send me a copy of your new vapor-degreasing booklet.
☐ Please have your representative phone for an appointment.

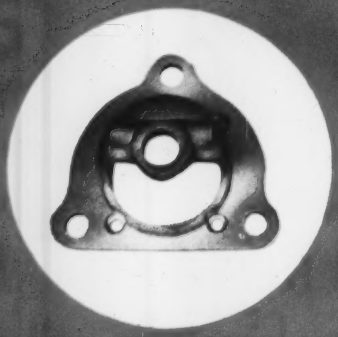
Name_____ Title_____

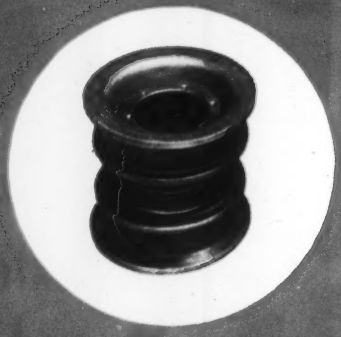
Company_____

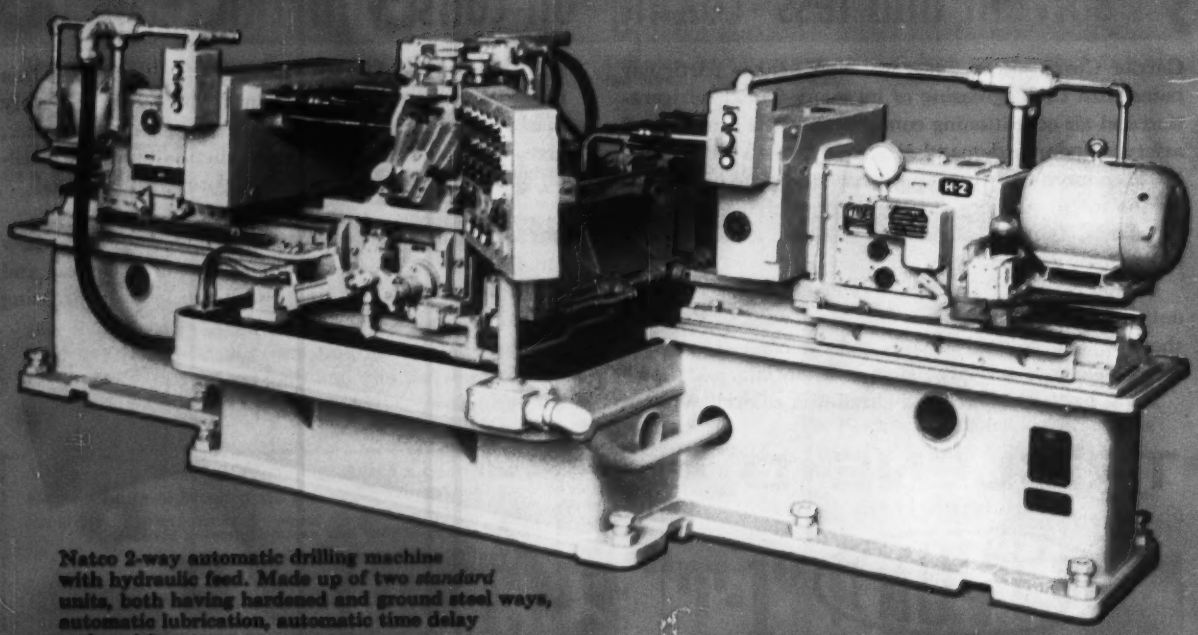
Address_____

City_____ Zone_____ State_____

Natco Standard Units Perform Special Jobs



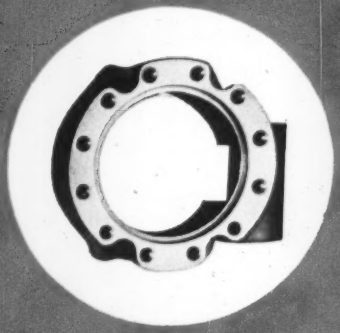


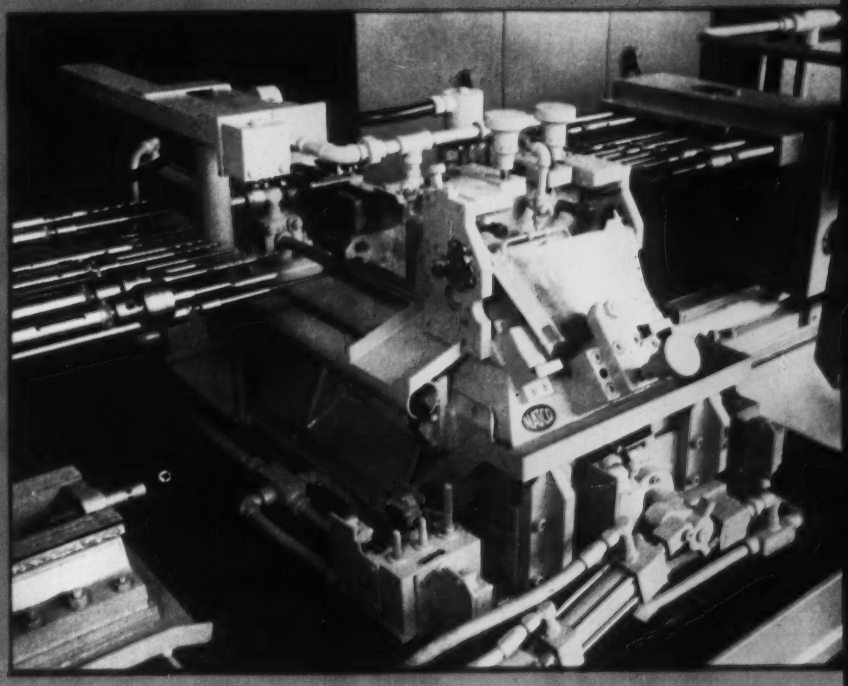


Natco 2-way automatic drilling machine with hydraulic feed. Made up of two *standard* units, both having hardened and ground steel ways, automatic lubrication, automatic time delay and positive stop.

Many *special* jobs can become routine with Natco's *standard* unit design. Take these parts, for instance. Unique parts presenting unique problems. Natco solved them by using *standard* horizontal, self-contained Holeunits with automatic fixtures. Varied operations are performed—production to meet customer's requirements.

Natco's use of *standard* units can mean quicker delivery and lower price to you. Call a Natco Field Engineer to determine whether Natco's *standard* unit design can solve your "special" problems.





Ask for information about the PAYD (Pay-As-You-Depreciate) Finance Plan.

NATIONAL AUTOMATIC TOOL COMPANY, INC.

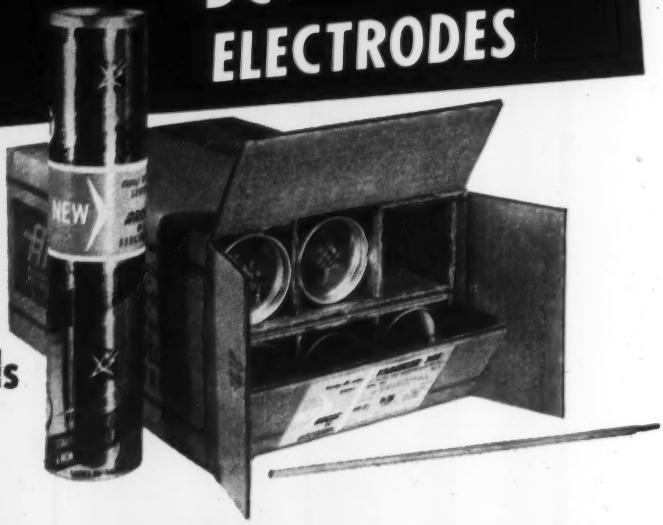
Richmond, Indiana

NATCO

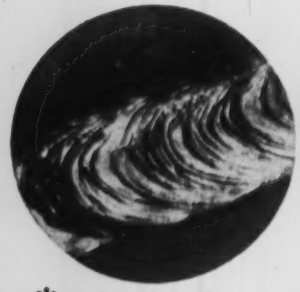
Multiple-spindle drilling, boring, facing and tapping machines. Special machines for automatic production.

Call Natco offices in Chicago, Detroit, Buffalo, New York, Boston, Philadelphia, Cleveland and Los Angeles; distributors in other cities.

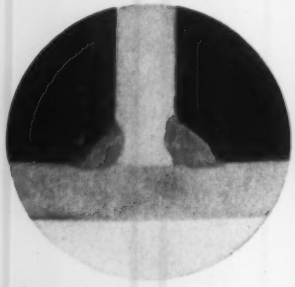
NEW ARCOS AEROCOR and FABRICOR DC ELECTRODES



*Assure all the benefits and properties you want when welding stainless steels

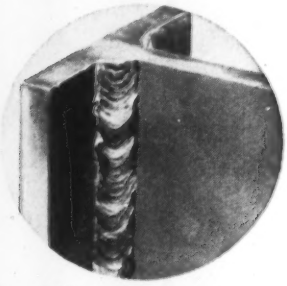


*sound weld metal . . . good bead appearance



*proper weld contour . . . good penetration

*quick, easy slag removal



*sound fillet welds—even when welded vertical up

● Whatever benefit you need, you'll get it along with easier, faster welding when you use *new* AEROCOR or FABRICOR DC Electrodes.

The AEROCOR Series is especially designed for welding stainless sheet metal. The FABRICOR Series is especially designed for heavy metal fabrication. Both are available in a wide range of stainless grades and diameters. Both are used with DC reverse polarity current.

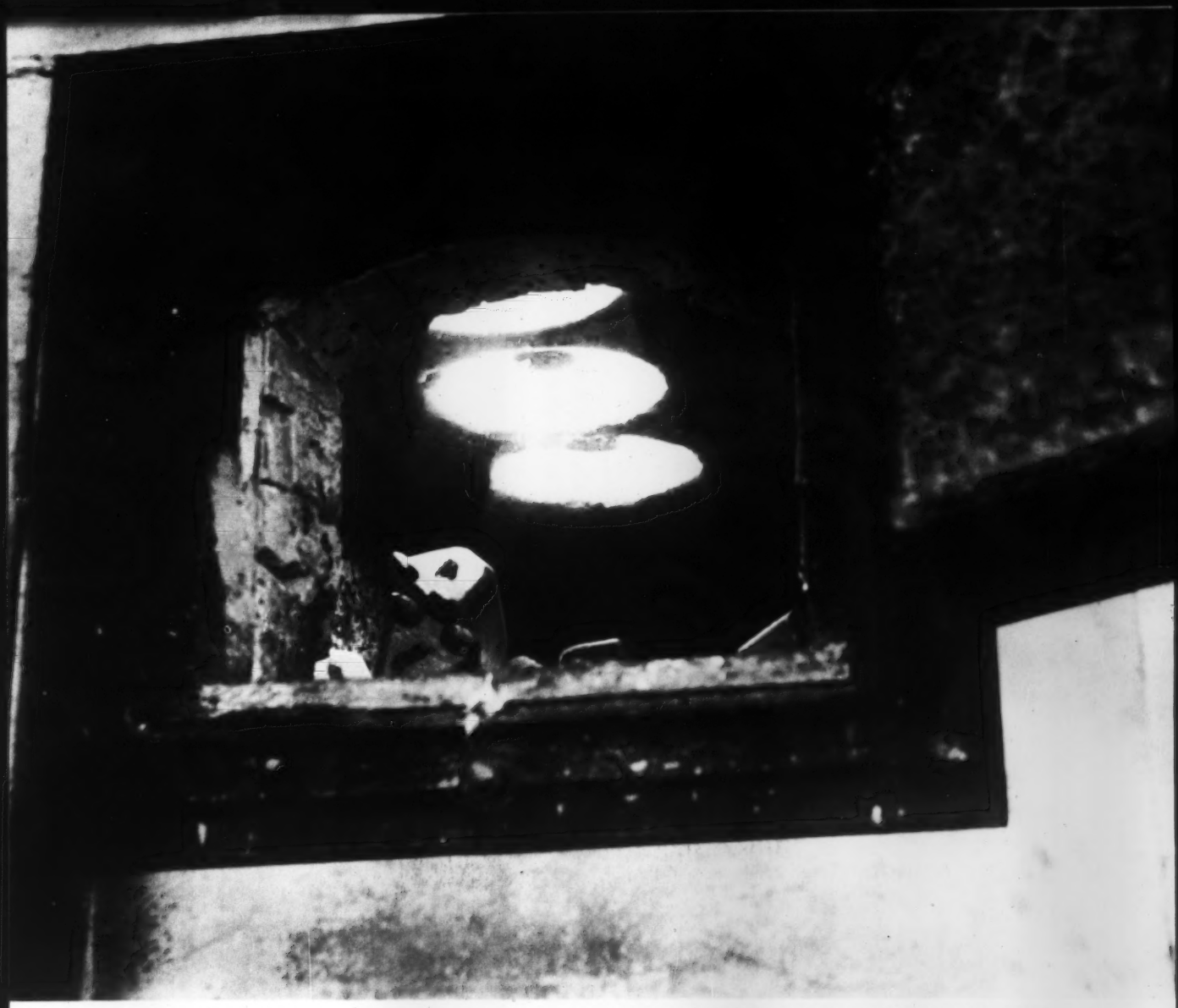
Before being publicly introduced, both types of these *easy-to-use* electrodes were demonstrated and tested in a group of specially selected plants and weld shops. The opinion of everyone involved was practically unanimous: AEROCOR and FABRICOR Electrodes are easiest to use . . . most uniform and dependable in results.

Electrode	Types Available						
Aerocor	308	309	310	316	347	349	410
Fabricor	308	309	310	316	347	—	—

FOR A FREE DEMONSTRATION in your own plant, simply drop us a line on your company letterhead. Of course, there's no obligation.

More than ever it pays to . . . **WELD WITH ARCOS**

ARCOS CORPORATION • *1500 South 50th Street* • *Philadelphia 43, Pa.*



Roof arch of aluminum-melting furnace being fired up at Doehler-Jarvis Division of National Lead Company, Pottstown, Pennsylvania. Laclede-Christy "Steel Cast," a castable refractory containing Lumnite cement, replaced brick arch roofs in 31 furnaces. Refractory-concrete roof arches reported in excellent condition after two years of service.

Furnace Refractories give top performance with **Lumnite*** Concrete.

In job after job, where extreme temperatures and thermal shock are encountered, experience has shown that Refractory concrete made with Lumnite cement will give excellent service in aluminum-melting furnaces, also in other furnaces of many types, large and small.

Refractory concrete can be easily placed, using your own plant work force. Service strength is reached within 24 hours. A convenient way to make Refractory concrete is with castables. These are packaged mixes of Lumnite calcium-aluminate cement and selected aggregates designed for your specific job. They are prepared and distributed by leading manufacturers of refractories.

UNIVERSAL ATLAS CEMENT COMPANY

UNITED STATES STEEL CORPORATION SUBSIDIARY

100 PARK AVENUE, NEW YORK 17, N. Y.

* "LUMNITE" is the registered trade-mark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.

L-125

Atlas® Lumnite Cement

FOR INDUSTRIAL CONCRETES

REFRACTORY • INSULATING • OVERNIGHT • CORROSION RESISTANT

OFFICES: *Albany • Birmingham • Boston • Chicago • Dayton • Kansas City • Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh • St. Louis • Waco*

United States Steel Hour—Televised on alternate Wednesdays—See your local newspaper for time and station

"We forged 10-foot rings from a 5-foot ingot... in stainless steel"

says **John Matthews,**
U. S. Steel General Foreman—Forging

It required many days to take the photographs on this page, days of forging and re-heating. The forgings are made from type 304 stainless steel, and they're destined for a nuclear power plant. Now read why it took so long to make them.

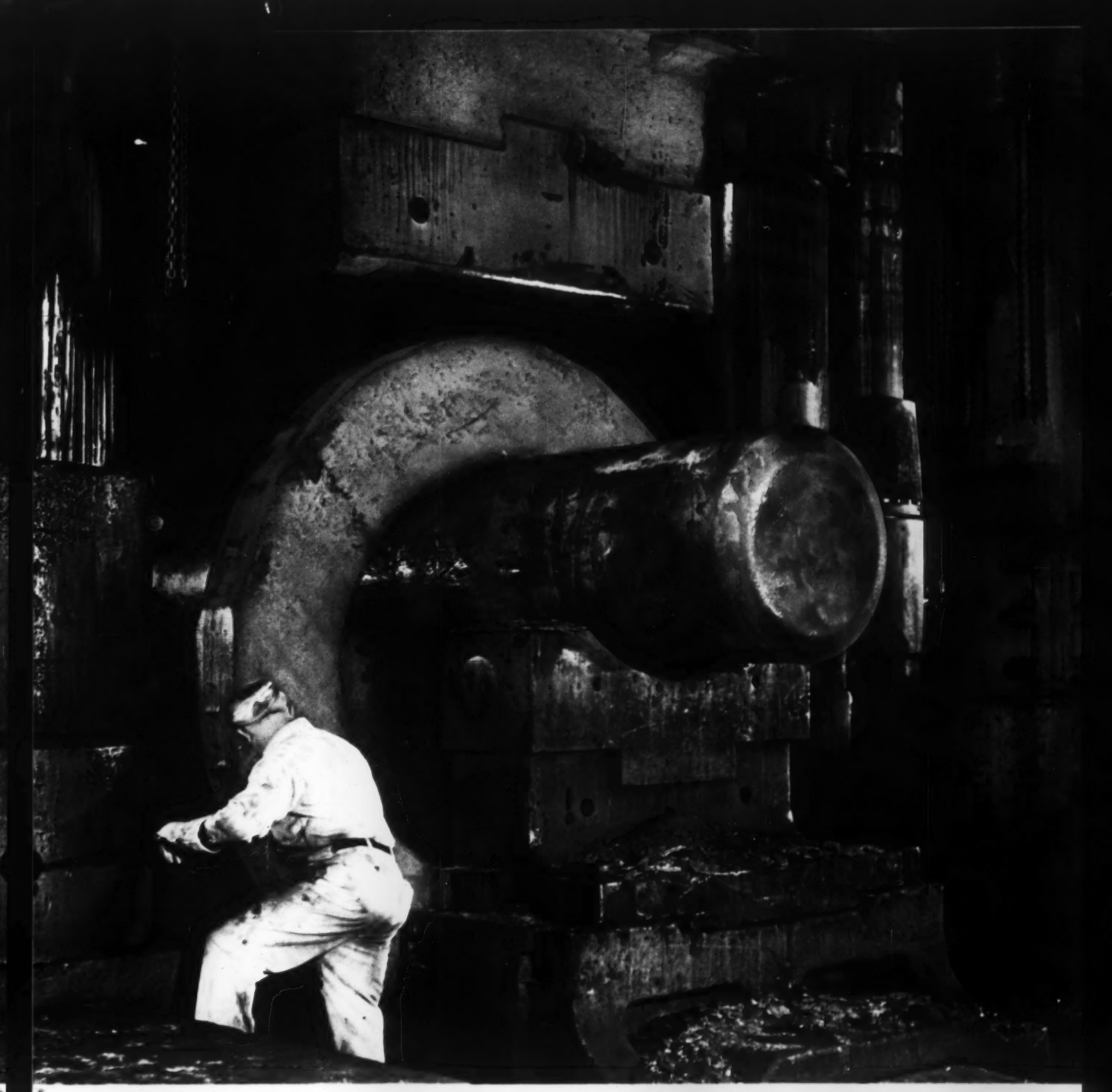
Stainless is strong and stiff, even at forging temperatures. It requires more passes through the press, more die pressure, and the dies wear out faster. If you forge it too long, so that it gets "cold," it will develop small surface cracks beneath the great jaws of the press.

In John Matthews' words:

"We started with a 59″ fluted ingot and forged it down to a 40″ octagon, then sliced it into three flat discs. The thickest disc was forged down to 18″, and we put a 23″ hole through it with steel punches. Then it was worked over the big steel mandrel to finished size: 119″ outside diameter, 80″ inside diameter, 10½″ thick. The other two rings were somewhat thinner."

It was a tricky job, but USS Quality Forgings like this are being turned out every day because we've got the men with the skill to do the job right.

We'll certainly appreciate your inquiries. Send them, or requests for our free 32-page booklet on USS Quality Forgings to: United States Steel, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.



USS QUALITY FORGINGS

heavy machinery parts . . . carbon, alloy, stainless
forged steel rolls and back-up roll sleeves
electrical and water wheel shafts
specialty forgings of all types

UNITED STATES STEEL

HOW USS "T-1" STEEL IMPROVES THESE PRODUCTS:

Pays Off In Payloader. Speed is emphasized in International Harvester's new Model 12 Payloader. That means weight had to be cut. And USS "T-1" Steel helped cut weight of the rugged boom. This remarkably tough, strong steel is used at top and bottom sides where maximum stresses are imposed. The section depth of the USS "T-1" Steel parts is 12 inches. With other, less strong steels, section depths of 19 and 24 inches would have been required—much too large to fit the contour of the machine. USS "T-1" Steel cut size, weight . . . was cold bent, and welded to other parts of the machine by automatic submerged arc welding.

Stops Brake Breakage. Columbiana Cylinder Grinding Company, Columbiana, Ohio, does a lot of custom machining on industrial and mining equipment, including repair of brake and clutch bands for large earthmoving equipment. On the original equipment these bands are made of plain mild steel . . . often break under the tremendous stresses encountered. Columbiana replaces these broken bands with new ones of USS "T-1" Steel—has yet to have a USS "T-1" band break.

More Strength, Less Weight. This lift truck, in use at Baltimore Concrete Plank Corporation, and manufactured by Gerlinger Carrier Company, Dallas, Oregon, is the largest standard line lift truck on pneumatic tires in the world. USS "T-1" Steel reduced the width and thickness of the forks on this truck. In addition, this extremely tough constructional alloy steel eliminated the need for shipping the forks 75 miles for heat treatment, which was required with the alloy steel previously used.

HOW IT CAN HELP YOU

USS "T-1" Steel, with its high minimum yield strength of 90,000 psi and its minimum tensile strength of 105,000 psi, can help you design or build lighter-weight equipment that will last longer. Its unusual toughness can help you design or build equipment capable of taking severe impact and abuse at sub-zero temperatures. Its excellent weldability can help you cut the cost of fabricating highly stressed parts, and reduce repair and maintenance expense. Its good creep rupture strength can help you put more durability in equipment that operates at temperatures as high as 900 degrees F.

Somewhere in your operation, versatile USS "T-1" Steel can help you. For technical assistance or information, write, wire, or phone United States Steel, Pittsburgh 30, Pa.

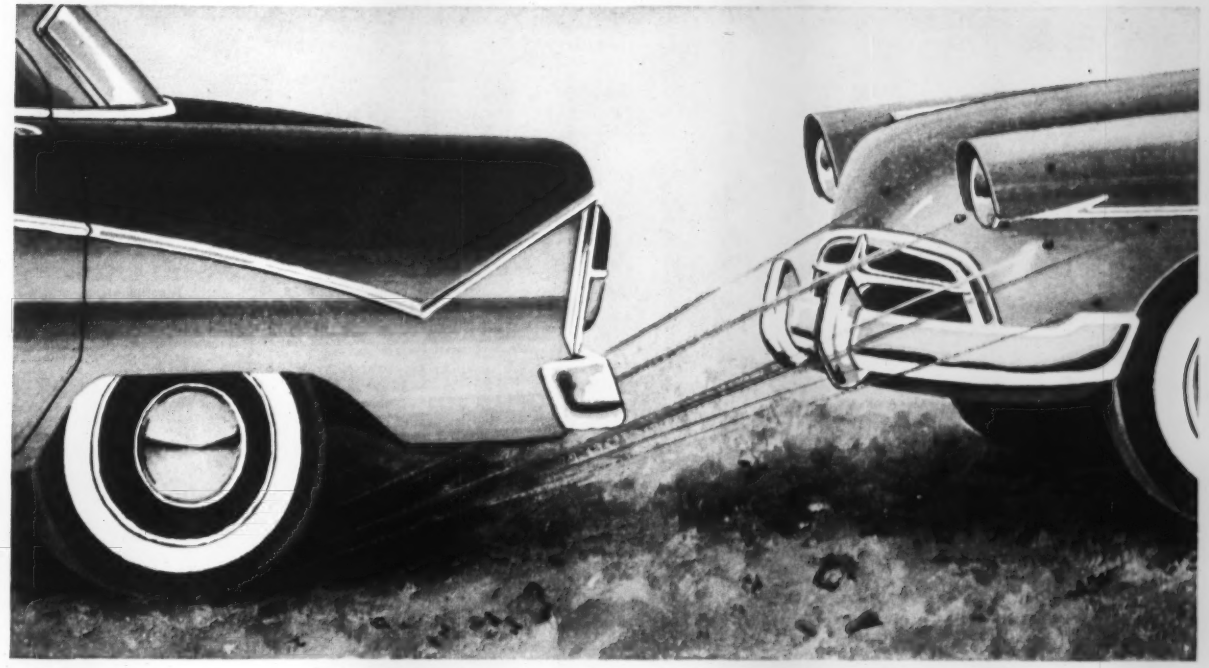
UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS "T-1" CONSTRUCTIONAL ALLOY STEEL

SEE The United States Steel Hour; it's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

USS

UNITED STATES STEEL



NEW HIGH IN IMPACT-RESISTANCE

under organic finishes:

Pennsalt FOSBOND zinc phosphate coatings

Rough treatment, chipping impacts, severe weathering and corrosion—those old paint-damaging standbys—are no longer bogeys to the organic finishing operation. Pennsalt's know-how in metal surface preparation has produced a series of FOSBOND® zinc phosphate coatings that protect steel surfaces against these abuses better than other methods thus far developed.

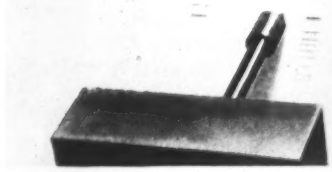
If your problem is impact . . . corrosion . . . other chemical and physical conditions that wreak havoc on paint adhesion—there's a Fosbond cycle to meet it, at low cost and without any change in your present equipment.

Let the man who knows look at your phosphating problem! He's from Pennsalt, where the greatest store of metalworking chemical knowledge is ready to help you. Call him or write Metal Processing Dept. 369, Pennsylvania Salt Manufacturing Company. East: Three Penn Center Plaza, Philadelphia 2, Pa.; West: 2020 Milvia Street, Berkeley 4, Calif.

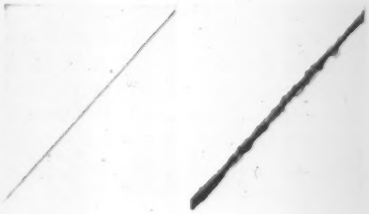
In Canada: Pennsalt Chemicals of Canada, Hamilton, Ontario.

Pennsalt Chemicals

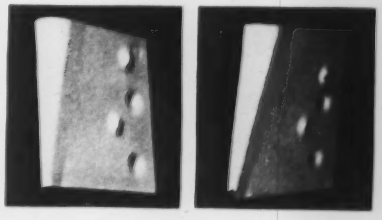
Metal Cleaners • Phosphate Coatings • Cold-Working Lubricants



CHIP-RESISTANCE. Finishes on Fosbonded panels resist twice the weight of impact as do finishes applied over conventional zinc phosphate coatings.



SALT-SPRAY TEST. No creep of corrosion on Fosbonded panel after 300-hour exposure, while conventional zinc phosphate allows 1/16" undermining of paint film.



IMPACT TEST. No paint fractures on impact and bending of Fosbonded panel (left), while paint on panel with conventional coating fractures from same treatment.

A BETTER START FOR YOUR FINISH

Walter Casler, left foreground, foreman of automatic production, and Les Danner, assistant purchasing agent, inspect Pittsburgh Steel Company high-carbon, oil-tempered MB wire at Raymond Manufacturing Company plant at Corry, Pa.

Peter Dubrosky, assistant to chief inspector at Raymond Manufacturing Co., Corry, Pa., plant, measures extension of a Westinghouse Laundromat tub spring during a quality control inspection.

You Own 1,000 Springs

Pittsburgh steel wire used by Raymond Manufacturing Co. in long-lasting Westinghouse Laundromat® Springs

One thousand springs of all sizes, shapes and functions are the property of the average home owner. And if the family car is included, the figure would be over 1,600.

Count the many springs in one popular model refrigerator. Add the tiny springs that control thermostats in electric or gas ranges. Throw in the three rugged springs that suspend the automatic washer's tub (if it's a Westinghouse Laundromat®).

Springs serve every day in dozens of ways—silently, surely and safely. Making them is a job requiring top-flight design, best quality materials, the latest coiling machines, plenty of experience and know-how.

A case in point—take one of the nation's oldest and largest spring makers, Raymond Manufacturing Company, a division of Associated Spring Corporation.

• **Three Vital Springs**—Raymond helped develop and now makes three vital springs which support the tub unit in Westinghouse Electric Corporation's Laundromat. A major supplier of the .207 oil-tempered MB wire from which the springs are coiled are Pittsburgh Steel's wire mills in Monessen, Pa.

Raymond meets Westinghouse's rigid specifications precisely. And Raymond officials give Pittsburgh wire credit for a strong assist.

Les Danner, Raymond's assistant purchasing agent who buys 2,200

(Advertisement)

sizes and types of materials at Corry, Pa. says:

"I'm fully sold on the quality of Pittsburgh Steel's wire. Pittsburgh Steel has become a major supplier for us because its quality is tops."

Walter Casler, foreman in the automatic production department, has 26 years of experience behind him when he says:

• **"Best I've Ever Seen"**—"I don't ever recall a rejection of Pittsburgh Steel's wire for quality. Pittsburgh's oil-tempered, especially, is some of the best wire I've ever seen."

Raymond must depend on the quality of the wire when making the Laundromat springs. These springs are coiled extension springs, tapered at one end to a bell shape. Two of the three springs on each tub are 6⅜ inches long, 2½ inches O.D., and weigh one pound, seven ounces each. The third spring is smaller.

The two larger springs must be capable of supporting 52 pounds at 9½" extension. At 11⅞ inches, they must carry 78 pounds. Because the three springs are the main support of the tub unit in the Laundromat, they must be both load-supporting and vibrating springs.

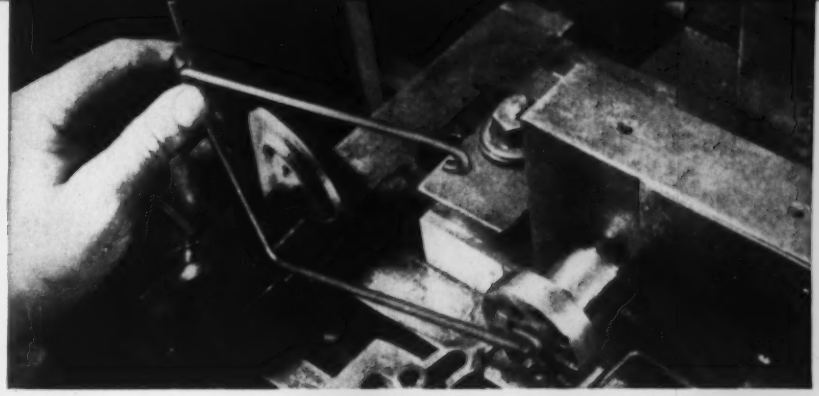
• **Surface Quality Counts**—If any of the three springs fails in use, the cost would be the expense of a complete dismantling to make repairs. That's why Raymond has installed a number of quality control inspections and tests throughout the production process.

Pittsburgh Steel also is Raymond's major supplier of hard-drawn, high-carbon MB wire. Pittsburgh Steel ships to Raymond tons of basic, bright, low carbon wire as well.

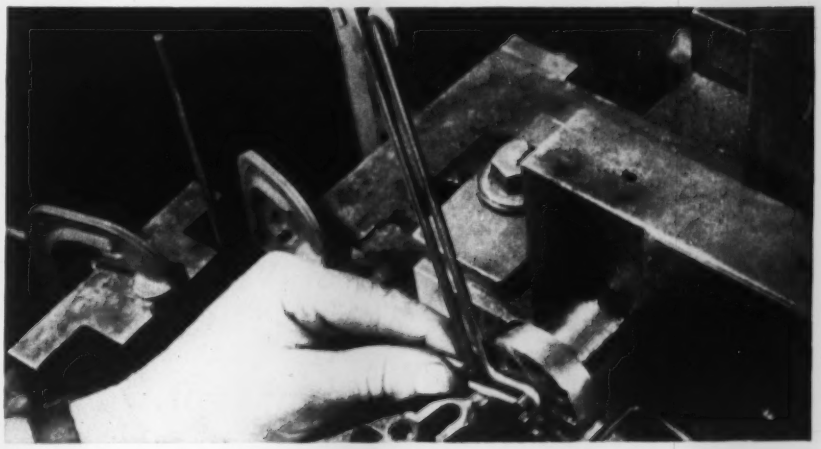
Raymond's experience with Pittsburgh Steel wire has been duplicated in many other plants across the nation.

Pittsburgh Steel's range of wire products can fit quickly, profitably into your operations. Its 50 years of experience in quality wire-making, its willingness to give service, its own extensive facilities and those of its subsidiary, Johnson Steel & Wire Company, can be the answer to your wire problem.

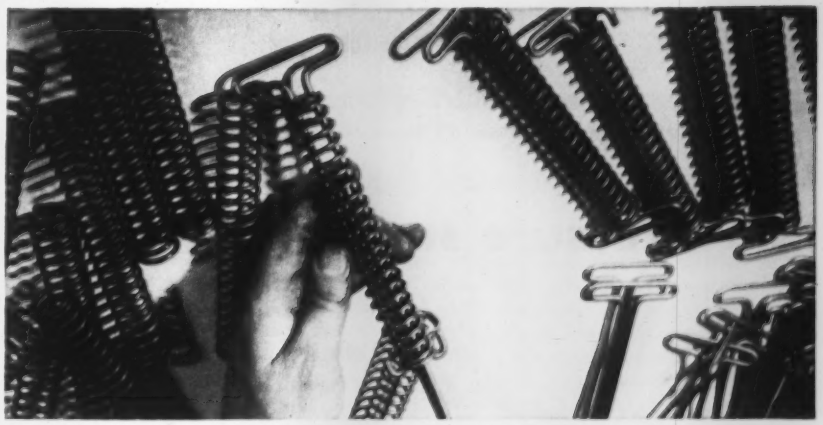
There's a national sales staff at your disposal. Contact any member of it today.



1. An 18⅝ inch piece of Pittsburgh Steel Company's .162 bright low carbon basic wire is hook wound on either end before being formed into a drawbar for extension spring on boat trailer.



2. Fourth and final forming operation in making drawbar is to form the loop.



3. Drawbars are inserted in opposite ends of 5⅞ inch spring to form unit. Spring is made from .105 hard drawn wire.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

District Sales Offices

Atlanta	Columbus	Detroit	New York	Tulsa
Chicago	Dallas	Houston	Philadelphia	Warren, Ohio
Cleveland	Dayton	Los Angeles	Pittsburgh	

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See what adhesives are doing today!

THIS 3M SEALER PERFORMS SO DEPENDABLY, DOUGLAS AIRCRAFT FINISHES CABINS ENTIRELY BEFORE PRESSURE TESTING.

Pressure sealing for 20,000 hours plus

In a large number of Douglas aircraft, this 3M pressure cabin sealer already has logged more than 20,000 hours without sign of failing. So far, there's *no known limit* to the endurance that its users can expect.

When 3M developed the first successful pressure cabin sealer in 1946, government specifications were written around it. Since then, 3M sealer has been used on more aircraft, logged more hours by far, than any other brand of pressure cabin sealer.

Available as a light or dark colored semi-liquid, this 3M sealer can be applied quickly and easily. It conforms to contours, fills voids, bridges gaps, cures quickly into a flexible solid. Airborne, it stays flexible, adheres tightly despite flight stresses, high altitude cold, desert heat and exposure to water, gasoline and oil.

SEE WHAT 3M ADHESIVES CAN DO FOR YOU!

Pressure cabin sealing is only one of the many problems 3M research is helping the aircraft industry solve. A special staff of experienced 3M experts stands ready to assist you. Consult your 3M Aircraft Field Engineer. Or for further information and literature write: 3M, Dept. 3010, 6411 Randolph Street, Los Angeles 54, California.

PRODUCT OF 3M RESEARCH

3M ADHESIVES

ADHESIVES AND COATINGS DIVISION, **MINNESOTA MINING AND MANUFACTURING COMPANY**

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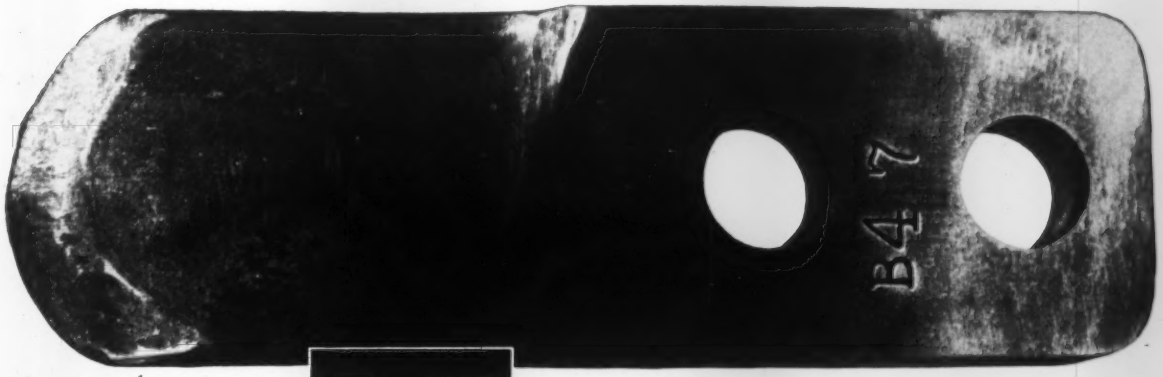
MAKERS OF "SCOTCH" BRAND PRESSURE-SENSITIVE TAPES • "SCOTCH" BRAND SOUND-RECORDING TAPE • "SCOTCHLITE" BRAND REFLECTIVE SHEETINGS • "3M" ABRASIVE PAPER AND CLOTH • "3M" ADHESIVES AND COATINGS • "3M" ROOFING GRANULES • "3M" CHEMICALS



This punch gave double service!

This block had double life!

This die lasted 50% longer!

B-47 HOT WORK STEEL

gives you more runs for your money

. . . anywhere from **1½** *to* **5** *times the Performance!*

SOME TYPICAL EXAMPLES

B-47 dummy blocks, vs. 9% and 12% tungsten types, extruded more than twice as many brass and copper tubes. B-47 dies outperformed 12% tungsten type 1½ to 1.

B-47 punches, vs. low-carbon 18-4-1 type, hot pierced more than twice as many eyes in steel axes. See top picture.

B-47 die inserts, vs. 9% tungsten types, hot pressed more than twice as many steel side gear forgings. B-47 die inserts, vs. regular insert material, performed better than 5 to 1.

B-47 dummy blocks, vs. 5% tungsten-5% chromium types, extruded twice as many copper and brass tubes and rods. B-47 dies outperformed 12% tungsten-12% chromium type.

B-47 punches, vs. 5% chromium type, hot extrusion forged 1½ times as many automotive steel front axle spindles.

B-47 die inserts, vs. 9% tungsten types, extruded 1½ times as many high alloy steel automotive valves. This is considered a very difficult job for any grade of hot work steel.

SEND NOW

for "Blue Sheet" on Grade B-47

This four-page folder gives technical data on B-47 for brass extrusion dummy block and dies, valve extrusion die inserts, hot punch tools, forging die inserts, press forging dies, and hot work in general. *Write for your copy today.*

ADDRESS DEPT. S-822

Looking for a better hot work steel? You'll find it in B-47—an improved chromium, tungsten, cobalt, vanadium type whose superiority is established by actual performance runs such as those summarized above. All tests show that B-47 has unusual resistance to shock and abrasion at elevated temperatures.

Developed originally for applications in the copper and brass industry, B-47 has given excellent results on difficult hot work jobs on steel. B-47, when properly heat treated, exhibits a well rounded combination of red hardness, toughness, and resistance to wear and heat checking that makes it a valuable addition to the Allegheny Ludlum group of hot die steels.

Put B-47 to the test. You'll find that it will do any number of severe hot work jobs without washing out or changing size. Get in touch with A-L, today. Let us help you to use B-47.

● *Allegheny Ludlum Steel Corporation, Henry W. Oliver Bldg., Pittsburgh 22, Pa.*

For complete MODERN Tooling, call

Allegheny Ludlum

WSW 6284

AL FINE TOOL STEELS SINCE 1854

(Advertisement)

Typical parts made of Alcoa Aluminum Screw Machine Stock by Enterprise Mfg. Co.

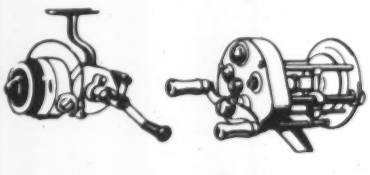
HOW PFLUEGER* MAKES MORE AND BETTER REELS WITH ALCOA® ALUMINUM SCREW MACHINE STOCK

Since Civil War days, 3 generations of Pfluegers have parlayed a small harness business into the giant Enterprise Manufacturing Company of Akron, Ohio . . . one of the world's foremost makers of fishing tackle. Alcoa Aluminum Screw Machine Stock has contributed to the sales appeal of Pflueger reels since 1929.

The Pflueger success story is typical of the competitive advantages frequently gained by a switch to aluminum screw machine stock. Its free-machining qualities speed production by permitting operations at maximum spindle speeds . . . with less tool breakage, fewer rejects, better finish with fewer secondary operations. It has longer tool life, provides three times as many parts per pound of metal. And abundant supplies are available.

All these solid economic advantages point up the wisdom of a hard commercial look at aluminum screw machine stock. Alcoa will provide you with technical assistance, alloys information, and the greatest store of experienced counsel available in the industry. Just call your nearby Alcoa sales office, listed under "Aluminum" in your phone book. Aluminum Company of America, 874-K Alcoa Building, Pittsburgh 19, Pennsylvania.

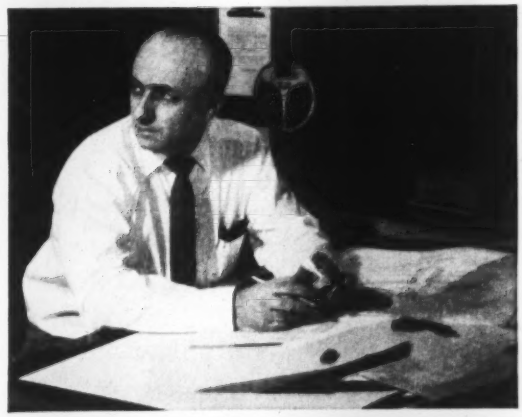
PFLUEGER



IN PURCHASING

Wayne Miller, Director of Purchasing, says,

"Pflueger reels have used aluminum parts since 1929 . . . and we've always bought our metal from Alcoa. Alcoa's personnel have always been most cooperative. Their shipping dates and promises always hit together. We especially like the shipping notices Alcoa forwards to us. Tolerances and composition always meet our most exacting specifications. Engineering help and warehouse service continue to keep us happy."



IN DESIGN

Mr. Tom Sarah, Chief Engineer of Design and Development, says,

"Our annual sales conference guides design policy. Customers began to insist on lightness; we were given the job of lightening up while still maintaining quality and dependability. Aluminum looked like a natural . . . and was. It takes the high-quality finish we require. It offers the corrosion resistance so essential when our reels are used in salt-water fishing. And Alcoa's research and development facilities were a great help to us in selecting proper alloys and finishes. We will be using more and more aluminum parts."

IN PRODUCTION

Garnett Young, Foreman, in discussing production with operator John Schmidt (left), says,

"Many of our workers are women and aluminum's light weight eases our materials handling. We get longer tool life and can hold closer tolerances on operations such as drilling, milling, tapping and machining. We cut fine-pitch threads and we prefer aluminum for this more than any other metal. Because aluminum is easier on tools, we get less heat and can use lighter oils. With aluminum, we have no trouble with concentricity. We run at top spindle speeds. There's less chip trouble and we get high prices for our scrap. If trouble develops, Alcoa sends engineering help to straighten us out in a hurry."

IN OUTSIDE SUPPLY

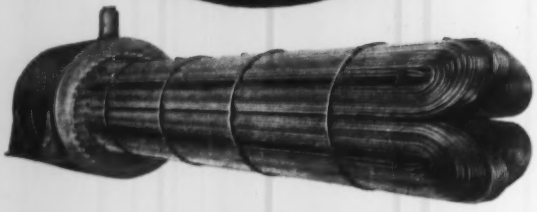
Some parts of the famous Pflueger reels are made by Locke Machine Company of Cleveland, Ohio. (Member of the National Screw Machine Products Association.) Here Mr. A. W. Glasheen, Estimator; Mr. J. E. Tomer, Vice President and Mr. E. H. Baker, Factory Manager, discuss the finish requirements of a Pflueger reel. They say, "Pflueger demands tight tolerances and a superfine surface finish. We find it easy to comply by using Alcoa Aluminum Screw Machine Stock. Tool life is good and we use extremely heavy machine feeds. Concentricity requirements are close, but we maintain them with aluminum. Our operators like to work with aluminum and we like to deal with Alcoa. Service has been extremely prompt, and their quality is excellent. We feel it is the best on the market. We have never had to reject Alcoa Screw Machine Stock.

THE ALCOA HOUR
TELEVISION'S FINEST LIVE DRAMA
ALTERNATE SUNDAY EVENINGS

Your Guide to the Best in Aluminum Value

ALCOA ALUMINUM
SCREW MACHINE STOCK

Highest Standard in Boiler and Pressure Tubing



Every length of Standard Boiler and Pressure Tubing is tested at pressures far beyond code requirements and can be readily bent or otherwise fabricated.

Electric welded boiler tubing is used today by all of the leading manufacturers of boilers and superheaters—stationary, marine, and locomotive—high or low pressure—and meets the requirements of government and commercial specifications.

With recent changes in the A.S.M.E. Boiler Code, it's now possible to use electric weld boiler tubing at pressures in excess of 2,000 lbs. High strength" Grade C" tubes are available for even higher pressures.

Uniformity of temper and wall thickness makes Standard tubes easier to roll for tight . . . sure fit. Standard's fine, smooth surface eliminates any need to polish ends for tight fit. Even a microscope won't spot the exact location of the weld.

Nowhere will you find any more modern and complete facilities for precision manufacture and inspection of Boiler and Pressure Tubing than you'll find at Standard.

For complete information on all Standard products and services send for free 8-page folder today.

Free 8-page folder on all Standard products. Write address below.

STANDARD

THE STANDARD TUBE COMPANY

24400 PLYMOUTH ROAD • DETROIT 39, MICHIGAN

Welded stainless tubing and pipe • Welded carbon steel mechanical • Boiler and Heat Exchanger • Exclusive rigidized patterns • Special Shapes • Steel Tubing – Sizes: ⅛" OD to 5½" OD – .028 to .260 wall • Stainless – Sizes: ¼" OD to 4½" OD – .020 to .165 wall.

More tin plate . . . mirror finish, precise alloy

Westinghouse line drive and control equipment for exacting, high-speed reflow methods helps your electrolytic tinning lines produce more salable tin plate . . . faster.

Here's how you can give your tin plate a competitive edge

WATCH WESTINGHOUSE!

WHERE **BIG** THINGS ARE HAPPENING **TODAY!**

With Westinghouse radio-frequency equipment . . .

Smooth, lustrous tin plate at speeds of 2100 fpm, and beyond

Westinghouse equipment for tin-plate reflow operations helps you produce the delicate alloy balance necessary to form tin cans easier, maintain high production rates.

Westinghouse radio-frequency induction heating equipment for high-speed lines . . . both horizontal and vertical acid type . . . keeps coating thickness precise and constant by automatically adjusting plating current in proportion to line speed. Electromagnetic induction, transferring power to the strip without physical contact, melts the tin and creates a bright, nonporous surface.

This process works so fast that it produces an actual flow line on the moving strip. A photoelectric scanner continuously scans the flow line and uses it to maintain heating at the precise, desired level. There's no overheating or underheating . . . the electric equipment is capable of maintaining speeds of 2100 fpm and beyond. You save valuable tin, reduce menders and boost output of prime tin plate. Production scheduling is simplified because photoelectric scanner handles most changes in gauge and speed without adjustment.

How Line Control Operates

Magamp* magnetic amplifier regulators (VR) control voltage of the entry, main and delivery generators assuring fast, even acceleration and deceleration and minimum loop variation during steady operation. Loop regulators act as verniers in controlling generator voltages.

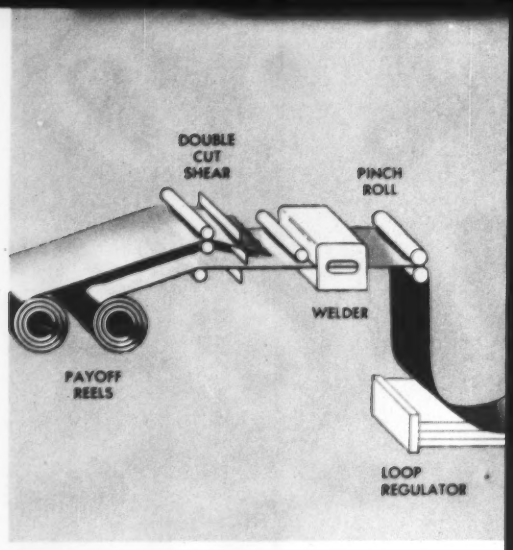
Magamp current regulator (CR) for booster and Magamp counter emf regulator (CEMFR) for motor work together to maintain regulated tension by the pay-off reels (POR) and winding reels (WR). Inertia compensation (IC), proportional to accelerating loads and stall tension signals, is introduced through the (CR) circuits.

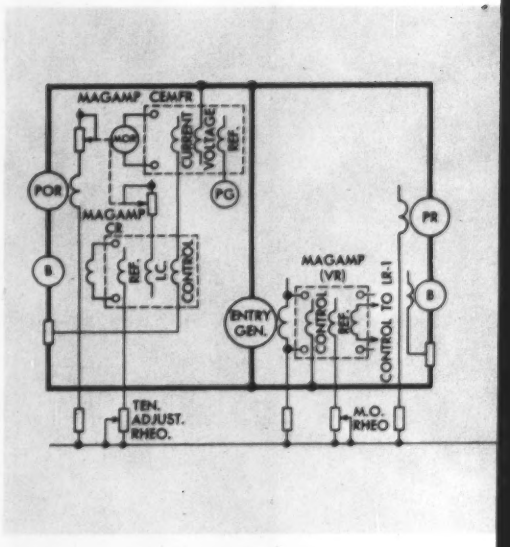
Photo-thyratron loop regulators (LR) provide modulated control of storage loops for smooth operation.

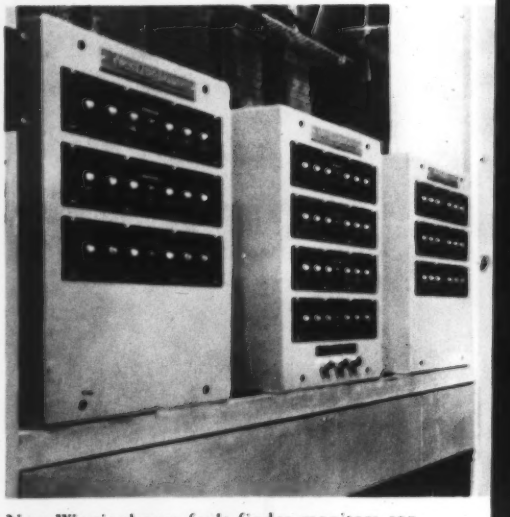
Electronic regulators control top and bottom plating current to deposit proper tin coating on each side at all line speeds.

Machine characteristics are selected for optimum drive performance. Entry section pinch roll (PR), master bridle roll (MBR), and drag bridle No. 2 (DB-2), the pace setters of their respective line sections, are shunt-wound for flat speed-load characteristics. Tank drives (T) have high drooping characteristics which result in their developing only the power required to overcome their friction losses and inertia loads. Reel motors have overload capacities suitable for accelerating the large coils now used in most mills.

*Trade-Mark.





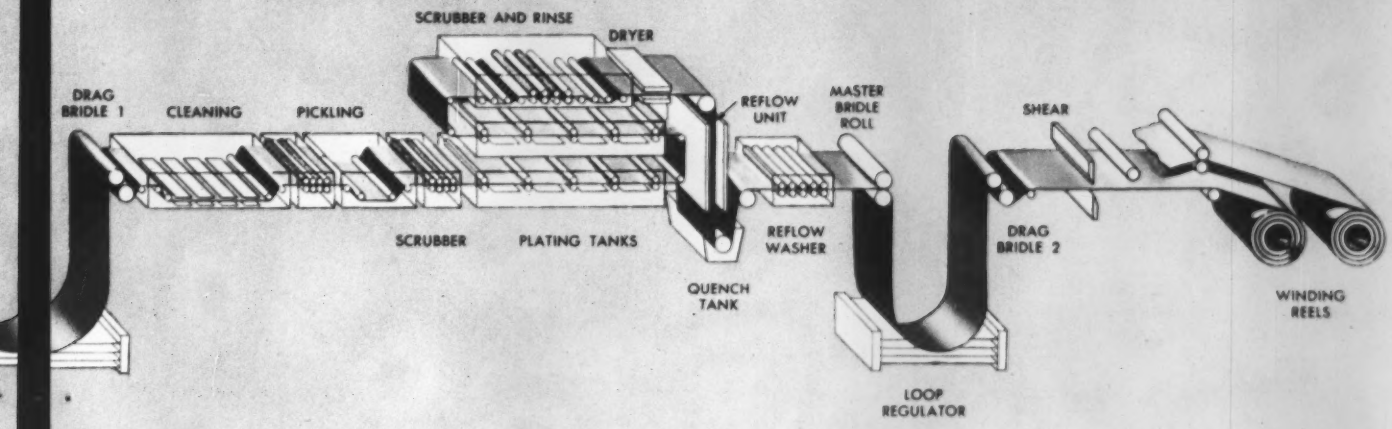


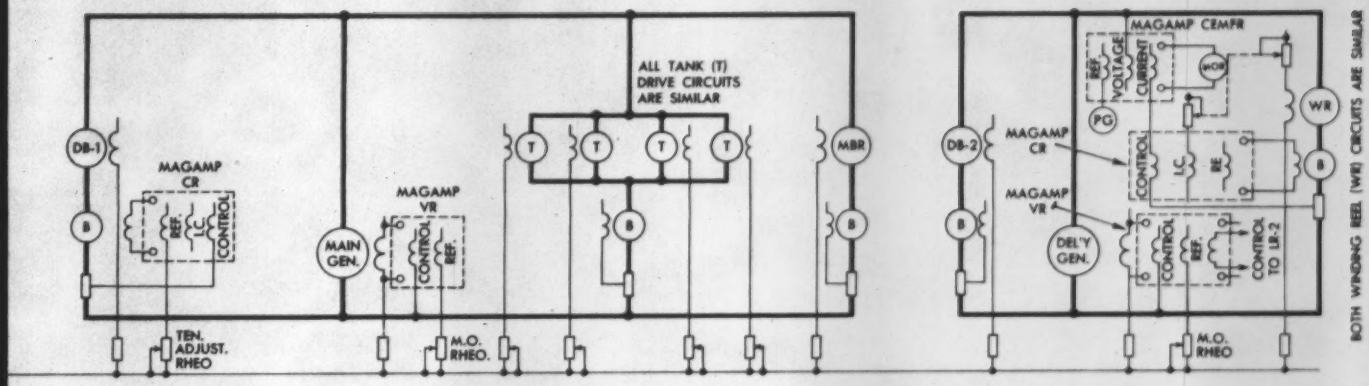
New Westinghouse fault finder monitors control circuits simultaneously, indicates system faults instantly . . . remembers them . . . makes trouble shooting easy.

WATCH WESTINGHOUSE!

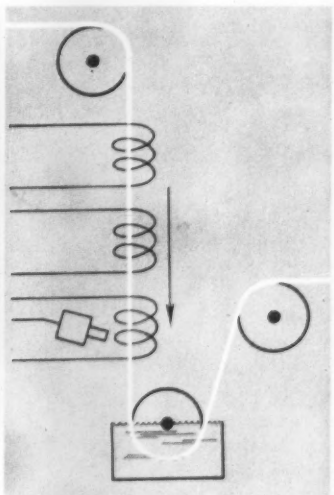
*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***

ELECTROLYTIC TINNING LINE





Westinghouse 2400-kw oscillator equipment supplies high-frequency power to inductor coils. Generator output can be raised or reduced 90% in a couple of seconds.



Photoelectric scanner measures light reflection of passing strip, regulates radio-frequency power application in fraction of a second through saturable reactor.

WESTINGHOUSE EQUIPMENT SERVES THESE USERS

COMPANY	LOCATION	RATED LINE SPEED FPM	TIN FLOW EQUIPMENT
Jones & Laughlin Steel Corporation	Aliquippa, Pa.	600	600 kw, RF
Jones & Laughlin Steel Corporation	Aliquippa, Pa.	2100	1800 kw, RF
Republic Steel Corporation	Niles, Ohio	1000	1000 kw, RF
Republic Steel Corporation	Niles, Ohio	1400	1400 kw, RF
Steel Mill	California	1500	3000 kva, conduction†
Weirton Steel Company‡	Weirton, W. Va.	1300	1200 kw, RF
Weirton Steel Company	Weirton, W. Va.	1300	1200 kw, RF
Weirton Steel Company	Weirton, W. Va.	2100	2400 kw, RF
Weirton Steel Company	Weirton, W. Va.	2100	2400 kw, RF
Youngstown Sheet & Tube Company	Indiana Harbor, Ind.	600	600 kw, RF
Youngstown Sheet & Tube Company	Indiana Harbor, Ind.	2100	2400 kw, RF†

†Not yet in operation. ‡Division of National Steel Corporation.

Several other electrolytic tinning lines have Westinghouse conduction or radio-frequency reflow heating equipment, but line drives of another manufacture.

Westinghouse d-c motors withstand tough treatment because Bondite* and Bondar* insulations have twice the life expectancy of ordinary insulation. This means longer service from drive system, as well as the motors. *Trade-Mark

World's fastest tinning lines are Westinghouse-equipped

Engineering for electrolytic tinning lines is the most demanding in a steel plant, and Westinghouse pioneering in this field dates back to early attempts to deposit tin electrolytically on steel strip. Westinghouse has supplied all the electric line drive and tin reflow equipment for the higher speed horizontal acid type lines, and is now building equipment for the highest speed, vertical acid type.

The fastest tinning lines have as many as 150 individual d-c motor drives. Combining these drives, the generators that supply power to them, the 12 to 15 operators' stations, and the 100-foot-long controller into a coordinated drive system requires the kind of engineering and manufacturing talent Westinghouse can give you.

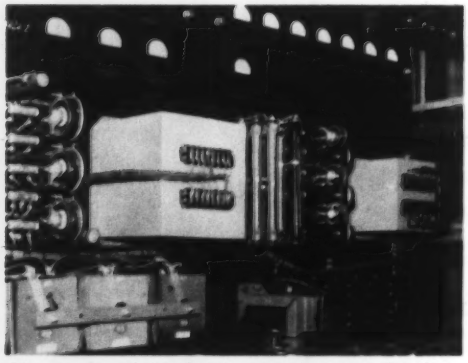
Reflow equipment, electro-cleaning and chemical treatment generators, switchgear, and numerous individual a-c motor drives and controls for pumps, scrubbers, welders and machinery adjustments must also be integrated into the system.

From planning to design, installation and start-up . . . Westinghouse brings decades of experience to you. A Westinghouse team will accept unit responsibility, and work with your engineering staff and consulting engineers in setting up your tinning line.

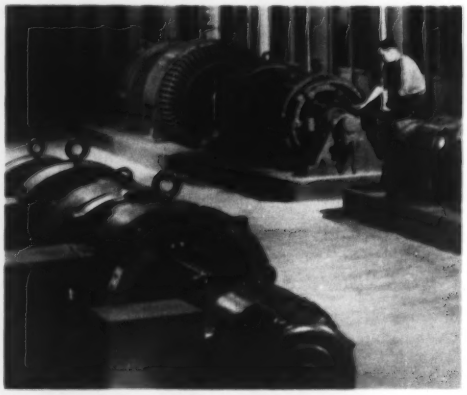
Contact your Westinghouse sales office for further details. Ask for a copy of B-6072, *Westinghouse Drives for Processing Lines.* Or write, Westinghouse Electric Corporation, 3 Gateway Center, P.O. Box 868, Pittsburgh 30, Pennsylvania.

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***



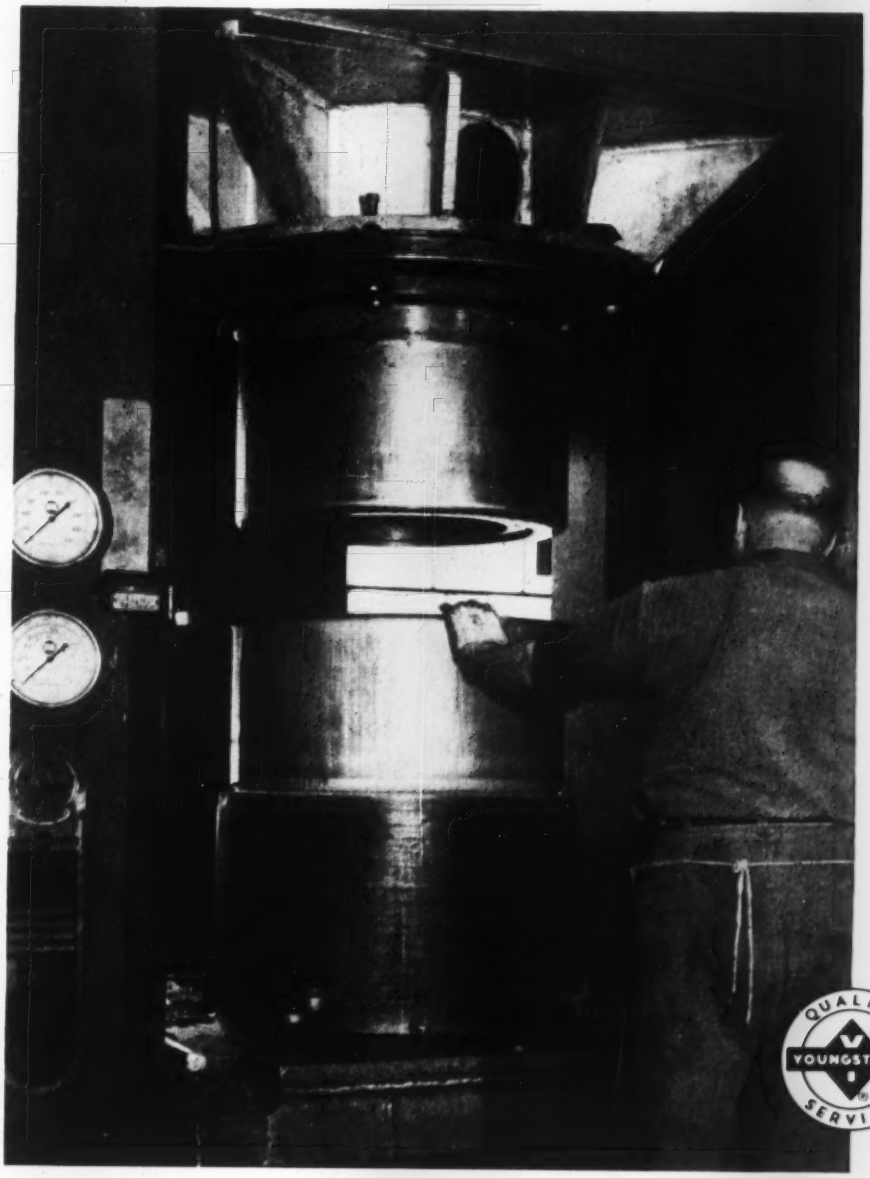
Magamp regulators have no moving parts, brushes, commutators, bearings . . . bring outstanding precision, dependability to line drive control.



Westinghouse large motor-generator sets are built with Thermalastic® insulation which provides 20% greater dielectric strength, 10 times greater voltage endurance, 30 times greater tensile strength than ordinary insulation.

MP-3047

When press costs climb fast put Youngstown sheets and strip on the job



Are rising production costs haunting your press shop? If so, why not specify Youngstown Cold Rolled Sheets and Strip and give a healthy shot-in-the-arm to your drawing and stamping operations. Satisfied users all over the nation tell us the same story: "Our production is up—Rejects are down!" This gives an over-all cost reduction which looks mighty good to any front office.

Youngstown Sheets and Strip are known for their uniform high quality. Rigid quality control of every phase of their production guarantees the proper ductility, tensile strength, flatness and surface finish to meet your **exact specifications.**

Why not call your nearest Youngstown District Office today, for additional information or metallurgical assistance—or write direct to our Home Office.

QUALITY YOUNGSTOWN SERVICE

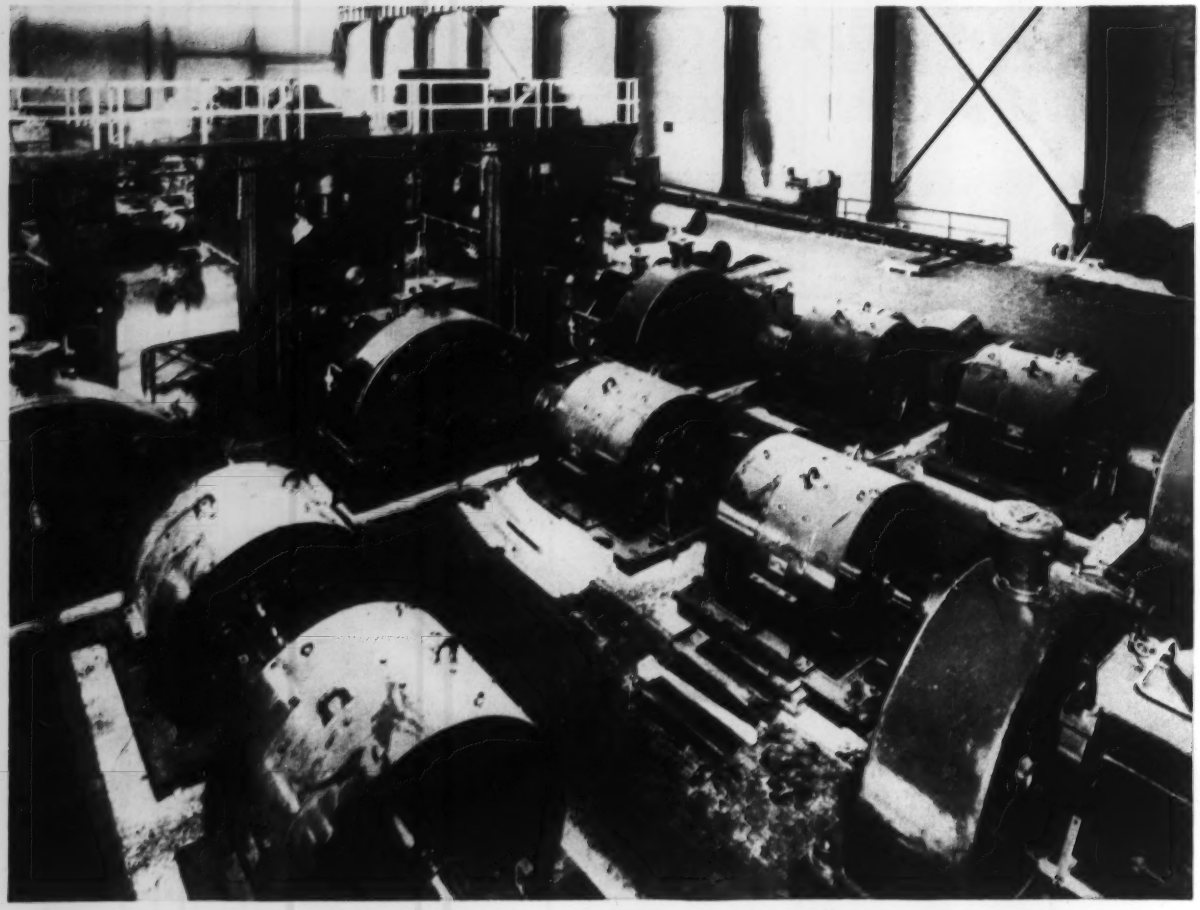
COLD ROLLED SHEETS AND STRIP

Youngstown
SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities

Producers of Quality Carbon and Alloy Steels for Over Half a Century



How polar additives improve gear lubrication

TO be effective, a lubricant for enclosed reduction gears and bearings must cling to metal even under adverse conditions. That is why *Texaco Meropa Lubricant* is fortified with polar additives—to assure a tough lubricating film that *stays on* the metal under *all* conditions.

In addition, you'll find that *Texaco Meropa Lubricant* has outstanding extreme pressure properties—EP that withstands shocks and heavy duty steady loads far in excess of manufacturers' requirements, and outlasts other lubricants.

Texaco Meropa Lubricant resists thickening; will not foam, will not separate, will not corrode gear or bearing metal.

Texaco Lubrication Engineering Service will gladly help you get the most efficient operation from all your equipment. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Meropa Lubricants

FOR STEEL MILL GEAR DRIVES

STEEL
October 29, 1956

Metalworking Outlook

Help for Small Business

Here are President Eisenhower's campaign promises to help small business: Congress will be asked to cut the federal tax on the first $25,000 of corporate income to 20 per cent. The present rate is 30 per cent. Other proposals would boost the ceiling on securities exempt from full registration with the Securities & Exchange Commission from $300,000 to $500,000, permit the Justice department to scrutinize more closely proposed mergers that might jeopardize the competitive position of small firms and extend the life of the Small Business Administration beyond its June 30 expiration date.

Housing Outlook

Home builders expect housing starts to drop 10 per cent next year, reports the National Association of Home Builders. Financing seems to be the major reason (see page 86). Few builders expect any improvement in the mortgage money supply between now and spring. Increasing construction costs are the industry's second most serious problem. But three-fourths of the builders think the situation by next spring will be improved or at least no worse than it is now . . . Bertram D. Tallamy has been named federal highway administrator to direct the U.S. road program (see page 79). He's now chairman of the New York State Thruway Authority.

Porcelain Enamel's Growing Market

Porcelain enamel manufacturers hope for a $100-million construction market by 1958. The volume is $50 million now, points out M. Jesse Salton, president of Seaporcel Metals Inc., Long Island City, N. Y. Once confined to the kitchen and bathroom, porcelain enamel finds its greatest building use for laminated-insulated curtain wall panels.

Oilmen Pump in $10 Billion

Look for the oil industry to spend $10 billion in 1956-57 on domestic expansion. Since World War II, the industry has pumped $38 billion into domestic expansion alone, points out Dr. Robert E. Wilson, chairman of Standard Oil Co. (Indiana) . . . The gas industry will spend $7.3 billion on capital expansion from 1956 through 1959, compared with $4.8 billion from 1952 through 1955.

Prosperity in West Europe

Substantially full employment and a rising standard of living in Western Europe are creating expanding markets for autos, appliances and other consumer goods. So says Harlow H. Curtice, General Motors Corp. president. Just back from Europe, he says a continued expansion of Western Europe's economy seems likely "but at a somewhat slower pace." He points out that GM will produce more than 100,000 Frigidaire units in France this year and that output there will be increased 40 per cent in 1957. Major

Technical Outlook—p. 121 Market Outlook—p. 157

portions of GM's European expansion program are to increase productive capacity of Opel in Germany and Vauxhall in England each to 250,000 cars and trucks annually.

West Germans Hike Steel Prices

West German steel prices have been raised an average of $8 per ton, plus a $1 boost on extras. Even so, the nation's prices are still substantially below world market levels (see page 157) . . . The country is in the grips of an "automation fever" not unlike that in the U.S. A large Univac has just been flown in for Battelle Memorial Institute's facility at Frankfurt. Many companies are installing electronic accounting equipment.

Tool Orders, Shipments Climb

Net new orders for machine tools in September amounted to $79.6 million, while shipments slipped slightly to $71.2 million from $75.1 million in August. National Machine Tool Builders' Association points out that for the first nine months, net new orders reached $737.6 million, 34 per cent greater than the figure for the same 1955 period. Despite the shipment decline in September, shipments for the first three quarters rose to $629.6 million, 32 per cent higher than they were in the same 1955 periods.

Atomic Power: Roadblocks?

Watch for more stumbling blocks on the road to atomic power. In Detroit last week, congressmen and labor unions teamed with an Atomic Energy Commissioner to attack the Monroe, Mich., power plant on the grounds that it will constitute a safety hazard. Those objections should be cleared up before the plant's scheduled operation in 1960, but they could be precedent-setting for other large facilities which are just getting into the initial stages. Thus far, the way appears clear for the Shippingport, Pa., plant to begin producing atomic electricity by next year.

Steelworkers Protest Dues Boost

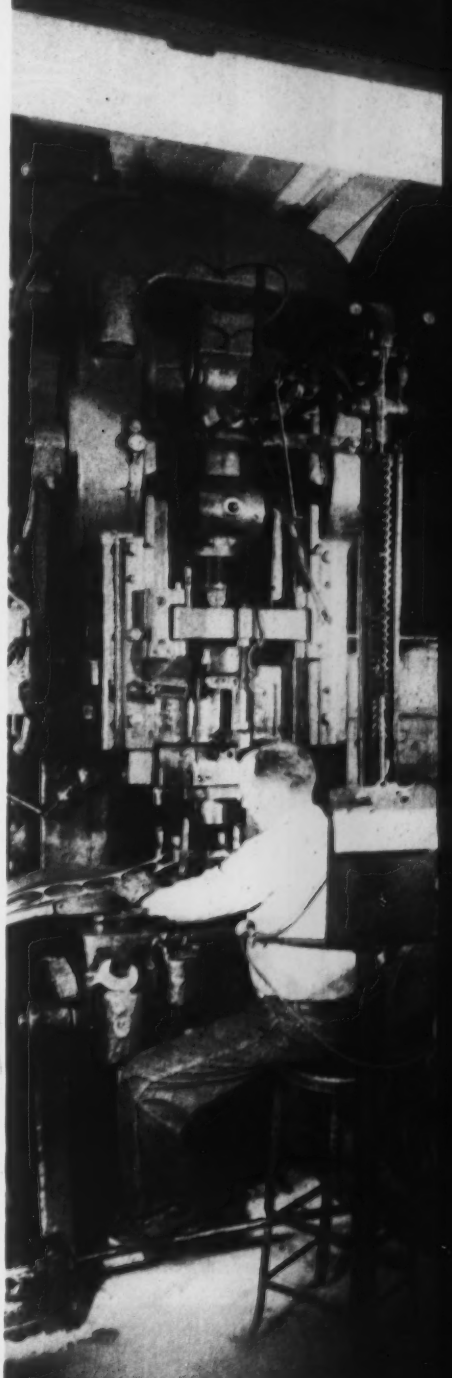
Strong protests over a $2-a-month boost in dues are flaring up among members of the United Steelworkers of America. Part of the increase was to raise salaries of top officials in the union. Centers of the dissatisfaction are in McKeesport, Pa., and Lorain, O., where petitions are being circulated. Petitions by one-fourth of the locals are required to obtain a special convention to reconsider the dues problem.

Straws in the Wind

Armco Steel Corp. has filed a new request for fast tax amortization, this one for $55 million to cover a proposed expansion and improvement program at Butler, Pa., part of which is already under way . . . General Electric Co. will raise prices 7.5 to 10 per cent on a wide range of small motors. Defense department says first quarter, 1957, aluminum setasides will be down 9 million lb from fourth quarter, 1956—from 146 million to 137 million.

pre-planned

results



In estimating production costs, one of the items a metal fabricator takes into account is the cost of steel. As important as this is, it is sometimes good economics to pay more for steel, but pay less in the end for the fabricated part. The cost of down time on expensive forming equipment, the cost of idle labor, the cost of reprocessing defective parts, may well exceed the cost of the extras built into restricted specification steel, which will eliminate these unplanned-for costs.

CMP restricted specification cold rolled strip steel can be pre-planned to minimize production delays and produce for you the production cost you need. We will welcome the opportunity to explore with you the cost-saving potentials in your manufacturing processes which may be available to you by use of **CMP** restricted specification cold rolled strip steel.

CMP

WHERE YOU CAN GET SPECIFIC SPECS FOR SPECIFIC JOBS

LOW CARBON, ELECTRO ZINC COATED, HIGH CARBON, TEMPERED SPRING STEEL, STAINLESS AND ALLOY

THE COLD METAL PRODUCTS CO.

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RESTRICTED SPECIFICATION COLD ROLLED STRIP STEEL boosts production, stops slow-downs, reduces die costs, meets feed and speed requirements of automatic equipment.

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STRIP PROVIDES the precision dimensional and physical qualities that solve many fabrication, cost and performance problems.

Stainless Steel Vaporizer Cup

Stainless Steel replaces cast iron in burner cup... saves 60¢ a part, cuts weight 90%

About a year ago a manufacturer of oil burners changed specifications from cast iron to stainless steel for this vaporizer cup.

It saves him $0.605 on each part—35 per cent on materials and labor alone—and practically eliminates service failures.

By welding a stainless steel spud (machined from ¾" hexagon-shaped bar) to the cup (drawn from .028 Type 304 stainless strip) the burner producer gets a more dependable part at much less cost.

The vaporizers formerly used not only created service problems but took a high toll in tool grinding and replacement costs. Switching to stainless ended this headache too.

Big cost savings . . .

OLD CUP
(Cast Iron—1.2 to 1.4% chromium)

Cost of casting	$1.090
Machining grinding, boring, drilling, tapping	0.274
Total (Material and Labor)	$1.364

NEW CUP AND SPUD
(Type 304 Stainless Steel)

Cup material	$0.330
Spud material	0.100
Drawing	0.119
Welding	0.200
Punching, beading cup and Machining spud	0.132
Total (Material and Labor)	$0.881

Material and Labor Saving	$0.483 (35%)
Overhead Saving	0.122
Total Saving per cup	$0.605

Weight cut 90%

Weight went down with costs. The cast iron cup weighed 5 pounds; the stainless cup weighs only ½-pound. What's more, the stainless cups are virtually immune to "burn-out."

It's Armco for Stainless

Armco's wide variety of stainless steels makes it possible for you to select the one right grade for your products. We produce all standard and many special grades in sheets, strip, plates, bars and wire. Get more information about Armco Stainless Steels by calling the Armco Sales Office near you, or writing us at the address below.

Armco Steel Corporation

2466 Curtis Street, Middletown, Ohio

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION

Why I Will Vote

The front cover of the Oct. 27, 1952, issue of STEEL carried an editorial by the late Earl L. Shaner (Editor-in-Chief, 1937-1954) on "Why I Will Vote." It is reproduced here as Mr. Shaner might have paraphrased it to apply to the 1956 election:

- **I believe in good government.**
- **I believe in honest government.**
- **I believe in efficient government.**
- **Especially do I believe in a solvent government.**
- **We have not always had this kind of government because you and I have been remiss in our exercise of the voting franchise.**
- **There have been times when pressure blocs and demagogues have barged into the vacuum created by our carelessness. They virtually ruled our nation.**
- **Their objective was to take all the traffic would bear and to hell with the consequences.**
- **I will vote Nov. 6 to make sure our federal government is one that is of all the people, by all the people and for all the people.**

In the 1952 election, 62.7 per cent of the population of voting age went to the polls. In 1948, only 51.5 per cent of the electorate voted.

If you believe in the kind of government described so lucidly by Mr. Shaner, don't contribute to this disgraceful indifference at the polls.

Urge your associates to vote Nov. 6. Vote yourself!

Irwin H. Such
EDITOR-IN-CHIEF

3 kinds of help on sheet and strip steel

Sheet and strip buyers tell us that three kinds of purchasing help keep them coming back to Ryerson:

1. WIDER SELECTION OF TYPES—More than 20 kinds of sheet and coil stock are on hand in an unusually wide range of gauges—making it easier to get the exact steel needed for any requirement.

2. GREATER PROCESSING CAPACITY—The most extensive cutting and processing facilities in the steel-service industry enable buyers to get quickest service on requirements for special sizes, strip and sketch cutting, blanks, slit coils, edging, or any other processing.

3. HELP ON SHEET AND STRIP PROBLEMS—The large Ryerson staff of sheet and strip specialists gives buyers a valuable source of help in selecting the most satisfactory and economical stock—or in solving any other problem of application and fabrication.

In addition, sheet and strip buyers like the good packaging, the dependable weight and on-schedule delivery that they get from Ryerson—and the convenience of one-order buying of all steel products from the same source. So call your nearby Ryerson plant for 3-way help on sheet and strip needs.

RYERSON STEEL

PRINCIPAL PRODUCTS: Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing, industrial plastics, machinery & tools, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Wire Reinforcement Institute

Highway Plan: Road to Profit

The program means big business for metalworking—in materials and equipment to build the roads and in commercial and industrial expansion certain to occur along new highways

THE NEW YORK Thruway was still under construction when estimates were made that more than $150 million worth of new plants had been built near it. Plants completed or being built along Boston's new expressway exceed $100 million in value.

Double Benefit—Those are tokens of things to come when the nation's giant roadbuilding spree hits its stride. Some predictors say that within a few years the increased investment in new industrial, commercial, residential and public building stimulated by the highway program may surpass the investment value of the highways themselves.

To Be Specific—What's in this multibillion-dollar pot of gold for metalworking? First there are the huge steel requirements for the roads. Steel also is needed to build the machines to build the roads and to build the machines that build the machines to build the roads.

Those industries are obvious benefactors. What about restaurant and motel fixtures? Service station equipment? Plumbing supplies and hardware? And so on.

From heat treating furnaces to kitchen ovens, reinforcing bars to paper clips—make as long a list as you want—chances are the business will grow as a result of the road program.

Employment—One big reason: More jobs. Associated General Contractors of America estimates that by 1960 the $8 billion to $9 billion a year road program will require a monthly average of 435,000 to 450,000 on-site workers. The present average is about 300,000. Upward of 630,000 will be on the job during summer months. About an equal number will be employed in mines, factories, transportation systems and administrative offices to produce the necessary materials, supplies and equipment.

About one-third of highway money will go for on-site wages and salaries which translate into

EQUIPMENT NEEDS FOR ROAD PROGRAM

HIGHWAY CONTRACTORS estimate they could have handled a $7.3 billion road program in 1956 with the equipment they have on hand. For each $1 billion over that, the road builders will have to invest about $0.5 billion in new equipment. Add to that 15 to 20 per cent replacement a year and it spells busy times for makers of construction machinery. No wonder builders like Caterpillar, International Harvester, Euclid and Bucyrus-Erie are investing heavily in new plant and equipment (see text). The big spurt in highways means that roadbuilding will soon account for more than its present one-third of the $2 billion annual sales of construction machinery makers.

DESCRIPTION	NO. UNITS AVAILABLE*	NO. UNITS NEEDED†
Construction Machinery and Allied Equipment		
Tractors, Crawler (1)	33,000	4,500
Tractors, 2 and 4 Wheel (Contractors Type)	9,300	3,000
Scrapers, Hauling (All Types)	17,200	3,200
Off-highway Hauling Equipment (End, Side and Bottom Dumps)	11,200	1,800
Power Cranes & Shovels	16,500	3,000
Motor Graders	15,100	2,500
Rollers, All Types	13,000	2,500
Loaders, Front End, Wheel	6,500	1,600
Ditchers & Trenchers	1,210	250
Hydraulic Hoists & Dump Bodies (2)	(70,000)	(16,000)
Air Compressors, Portable	13,750	2,250
Batching Plants, Concrete	4,000	300
Concrete Mixers, Portable	5,200	1,200
Contractor Pumps	41,500	2,340
Concrete Pavers	1,125	150
Concrete Spreaders	1,525	175
Concrete Finishers	1,525	175
Truck Mixers & Agitators	7,300	1,500
Asphalt Plants, Portable	2,000	200
Bituminous Pavers (Spreaders-Finishers)	3,040	300
Bituminous Distributors, Truck Mounted	6,500	250
Crushing & Screening Plants, Portable	2,300	250
Miscellaneous Units (10%)	20,928	3,144
Subtotal	**233,703**	**34,584**
Motor Vehicles		
Pickups & Autos	11,825	2,600
Trucks, 1½—3 Tons	42,350	9,600
Trucks, over 3 Tons	38,720	8,500
Trucks, Miscellaneous	4,050	1,800
Subtotal	**96,945**	**22,500**
Grand Total	**330,648**	**57,084**

(1) Including attachments and power control units.
(2) Not in total, included as integral parts of trucks and off-highway hauling equipment.

*** Equipment available for highway contract construction as of Jan. 1, 1956.**
† Additional equipment required for each $1 billion of highway contract construction over an annual volume of $7.3 billion.

Source: American Road Builders' Association.

homes, automobiles and appliances.

Electronics — The shortage of engineers is the most serious threat to fast expansion of the road program. Streamlining and standardization programs are under way to cut the present ratio of engineers per $1 million of highway work from eight to four. Aerial map making and surveying, photographic copying (instead of tedious tracing by hand) and high speed electronic computers are partial answers to the problem.

Sales of such labor saving equipment should head sharply upward. H. A. Radzikowski of the Bureau of Public Roads points out: Seventeen state highway departments have either installed or have on order electronic computers for engineering purposes. Most of the remaining states are extensively investigating the engineering uses of such electronic devices.

Further illustration of the way the road program will spread beyond steel and construction machinery: 246 county and local highway departments use radio telephone in managing mechanized maintenance and construction operations, and the number is rapidly growing.

Be Prepared — The impact on your own business may come sooner than you think. Commerce Secretary Sinclair Weeks recently reported: "Progress of the new Interstate Highway System and supplementary federal aid highways already is ahead of schedule. It is gaining momentum as more and more states start their programs."

How much your firm will grow is pretty much up to you. Competition will be keen: Perhaps that's the reason why few companies have tried to break into the construction supply market to take advantage of stepped-up roadbuilding. The program isn't so big that everyone can sit back and get fat by watching orders pour in.

Francis V. duPont, former commissioner of the Bureau of Public Roads, says: During the next 13 years, more will be apportioned for highway construction on the federal aid system alone than was spent during the last 26 years on all federal, state, local and city streets and highways put together. But industry spent in one year (1955) as much money for new plant and equipment as will be spent in 13 years on the federal-aid system.

Money, Money—Added to other roadbuilding, the program makes a pile of dough, and its effects spread out far beyond road building. Mr. DuPont says: "The magnitude is so great that few if any of us can evaluate its extent or its effects on our economy and posterity."

Not to be caught short, the construction equipment industry is pouring money into new plants even though estimates have been made that place last year's output below industry's capacity.

Caterpillar Tractor Co., for example, expects to spend $190 million on expansion and modernization in the next four years, almost as much as the company did in the previous ten years. Not all that is to up road building equipment capacity, but some is included.

Double Sales — International Harvester Co. has a multimillion dollar expansion going. Bucyrus-Erie Co. is building a $12-million plant to consolidate production of drilling equipment. Room left in two other plants will be used to boost output of excavating equipment. Studies indicate the company could hit annual sales of $150 million (about double the 1955 level) within five years. Preliminary planning is under way for expansion that would be necessary.

General Motors Corp.'s Euclid Road Division is setting up a new plant at Hudson, O., and sees additional expansion there over the next five years. Sales Manager Virgil Snow looks for sales to double by 1959, helped by the new facilities and an expanded equipment line.

Machine Tools—Just how much business this plant construction and bigger highway equipment sales will mean to machine tool builders is an unanswered question. Baxter Fullerton, assistant sales manager, Warner & Swasey Co., Cleveland, says that last year his company shipped about 9 per cent of its $40 million in tool sales to the construction industry; perhaps half of that went to road equipment builders. If those figures are typical (and several sources suggest they are), the road program could boost sales by several percentage points, especially if the more optimistic predictions for road equipment sales pan out.

Some experts see sales up 70 per cent next year, 150 to 200 per cent by 1958. One estimate puts the replacement market alone at $1 billion a year by 1960. Individual equipment builders, though, are more conservative. Except for fast growing newcomers, it's felt sales will increase about one-third over present levels by the time the road building program peaks off in 1959 or 1960, though increases for certain types may be higher.

MATERIAL-LABOR NEEDS FOR ROAD PROGRAM

CALENDAR YEAR		1956	1957	1958	TOTAL 1957-1969
	Units				
Structural Steel					
Wide Flange Shapes	Thousand tons	663	809	880	11,839
Standard Shapes		303	370	402	5,405
Bearing Piles		144	176	191	2,572
Sheet Piles		43	53	58	776
Wide Plates		87	106	115	1,544
Standard Plates		202	246	268	3,601
Subtotal		1,442	1,760	1,914	25,737
Reinforcing Steel (1)					
Bar		745	909	989	13,294
Wire		186	227	247	3,323
Subtotal		931	1,136	1,236	16,617
Corrugated Metal Pipe		165	201	219	2,938
Other Misc. Steel (2)		182	235	256	3,445
Total Steel		2,720	3,332	3,625	48,737
Cement (3)	Million bbls	74.0	94.5	102.9	1,339.0
Bituminous Material	Million tons	7.15	8.73	9.49	127.67
Aggregates (4)					
Purchased (5)		228	278	303	4,075
Produced (5)		316	386	419	5,635
Total Aggregates		544	664	722	9,710
Lumber	Million B.F.	403	492	535	7,194
Timber Piling		119	146	158	2,128
Concrete Culvert Pipe	Million tons	2.89	3.29	3.57	48.03
Clay Pipe & Tile	Thousand tons	55	67	73	983
Petroleum Products (6)	Million gal	744	908	987	13,280
Explosives	Million lb	102	124	135	1,812
Labor (7)	Thousand workers	365	424	442	5,118

(1) Does not include reinforcement to concrete culvert pipe.
(2) Includes steel guard rail, fences, cast iron pipe, pavement joint devices, tubular piling, nails, etc.
(3) Does not include cement in concrete culvert pipe.
(4) Does not include aggregates in concrete culvert pipe.
(5) By contractors.
(6) Includes gasoline, diesel oil, lubricating oil, grease, etc.
(7) On-site requirements, assuming 1,600 man-hours per year per worker.

A typical appraisal: "We estimate demand for our road building products (power cranes and shovels, truck cranes, road stabilizers, loaders, diesel aggregates, welding machines and electrodes) to reach its peak during the second year of the road building program and remain at that level for several years. The peak could well be 30 to 35 per cent above present levels; on some types and sizes of equipment, demand is expected to be more than twice normal." That's the opinion of F. Salditt, vice president, Harnischfeger Corp., Milwaukee.

And Components—Whatever the over-all increase, it spells good news for makers of industrial components. Replying to a STEEL survey, equipment builders indicated they would be buying more of 18 key components. Items in demand will include steel castings, air and hydraulic cylinders, gears, screw machine products, stampings and weldments.

An important side effect of the long-range highway program may be stabilization of expansion plans. It has had that effect at the Lima Works, Baldwin - Lima - Hamilton Corp., states T. J. Hunter, manager of industrial relations. He adds: "The next one to five years will be devoted to a continuing machine tool and plant rearrange-

ment program. Expansion will be primarily in machinery and tooling."

Enough Steel? — The highway program has had various effects on steel producers. Says one major company: "Our expansion plans definitely include facility increases for products needed for the highway program." But another comments: "None of our current expansion plans is geared to the highway program because we feel our present facilities will be adequate to meet the demands of the increasing activity in this area of construction."

Steel is definitely regarded as the most serious material supply problem. It may be years before expansion plans catch up with demand for structural shapes and plate. Competition from other construction, freight car builders, shipbuilders and oil country goods will keep the situation touch and go. Some bridges will be made of reinforced or prestressed concrete. Others will be held off until the needed steel is available.

Cost Cutter—A happier side to the steel picture: Steel as a cost cutter. Blaw-Knox Co., Pittsburgh, makes a form of 3/16-in. steel that saves one-third to one-fourth the time needed to do the job (setting, pouring and stripping) with a wood form. Steel forms cost $5 per square foot of contact surface, compared with only 70 cents for a plywood form, but re-use makes steel economical. Plywood is good for only about ten pours, steel for 300 to 400. There's no worry about warping and other bad weather damage with steel.

Holding the price line is important to competition-conscious contractors. How long they can do it is debatable even with the bigger, more powerful machines coming off the lines.

But that's one of the reasons the accent is on new equipment buying. Says Julien R. Steelman, president, Koehring Co.: "Fifty years ago, manual methods accounted for 95 per cent of the work on highway jobs, and power equipment handled only 5 per cent. Almost the opposite is true now."

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

More than Money

A well-planned training program is as effective in recruiting as high starting salaries

INTERNATIONAL Steel Co., Evansville, Ind., is co-operating with nearby educational facilities to get a jump ahead of the shortage of engineers and technicians.

It has two programs: 1. A co-op plan with three colleges to train engineers. 2. An apprentice program with a local high school to train structural draftsmen.

How It Works—At the college level, International Steel signs up prospective engineers when they graduate from high school. In addition to their college curriculums, these men work in International's engineering, estimating, sales and production engineering departments. Fifteen students under the plan are enrolled at Purdue University, University of Cincinnati and Evansville College.

The five-year program allows the student to earn $1.25 to $1.90 per hour at International, and he is reimbursed for transportation costs to and from school. Depending on the school he attends, the student may earn $6320 to $6928 during his college career.

Apprentices, Too — This plan uses the facilities of a high school to train structural draftsmen. The teachers are International employees, but they are paid by the school system. This four-year program gives the student 144 hours of classroom instruction annually, plus his regular employment at International or other participating firms.

Walter G. Koch, International's president, thinks the effectiveness of both programs lies in the student's ability to see exactly where the plan will lead him. This insight tends to combat recruiting activities of other firms.

Honeywell Expands in Suburbs

Minneapolis-Honeywell Regulator Co., Minneapolis, will build a $1½-million facility for its Valve division at Ft. Washington, Pa. Production in the 120,000 sq-ft plant is scheduled to start next summer.

The division will move from Philadelphia where 300 are employed. Employment will hit 1000 at Ft. Washington.

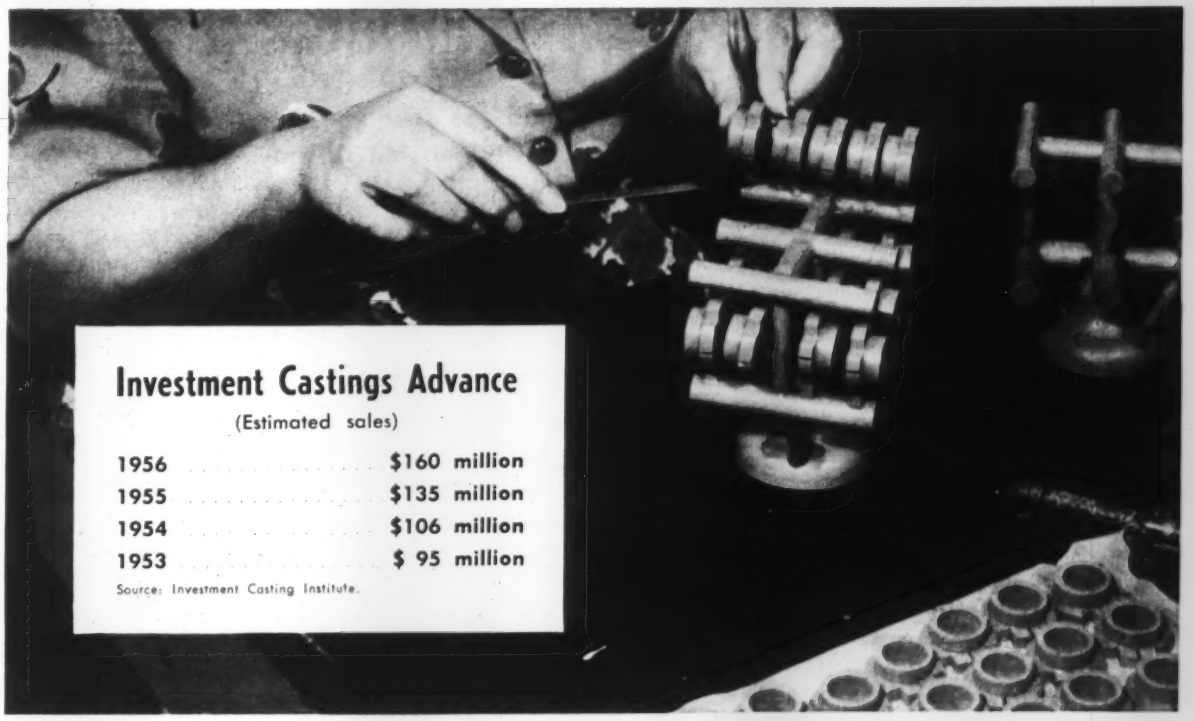
Harnischfeger Grows

About $2½-million will be spent by the Harnischfeger Corp., Milwaukee, for new buildings and equipment during its current fiscal year.

A 44,000-sq-ft building at Milwaukee will be devoted to welding, machining and finishing of sections of cranes and excavators. Over $1 million will be invested in machine tools.

U.S. Steel Uses Stainless Curtain Walls

Over 1000 all-steel panels will go into the office building of U.S. Steel Corp.'s Homestead District Works at Munhall, Pa. Sandwich construction reduces the panel thickness to 3 in. Panels are stainless or porcelain enamel on the outside; their inside surfaces are carbon steel. The building will be faced with stainless on the front and two sides. Porcelain enamel will be used on the back



Investment Castings Advance

(Estimated sales)

1956	$160 million
1955	$135 million
1954	$106 million
1953	$ 95 million

Source: Investment Casting Institute.

Allis-Chalmers Mfg. Co. The lost wax process produces parts accurate to 0.003 in. per inch

Precision Pays Off

Investment casters find increasing military applications and new civilian uses are boosting sales. Continued expansion in coming year is forecast by the industry

EXPANSION is the rule in the investment casting industry. Since 1953, sales have risen nearly 70 per cent.

Further growth in 1957 is a certainty.

One Detroit firm expects a 10 per cent increase in sales next year. Robert Miller, president, Precision Metalsmiths Inc., Cleveland, looks for a 15 to 20 per cent hike in his company's business in 1957. The president of Casting Engineers Inc., Chicago, V. S. Lazzara, predicts a 38 per cent increase for his company. Most enthusiastic is William B. Neal, director of sales and engineering, Cadmet Corp., Detroit. He expects next year's sales to double those of 1956.

War and Peace—World War II gave the investment casting industry its start with its brisk demand for jet blades. Components for jet engines probably are still the largest part of the business.

Government orders account for 50 to 60 per cent of the production of most investment casters.

In addition to jets, parts are used in rockets, missiles and electronic applications.

Commercial uses are spread over a multitude of industries. Mr. Lazzara, who also is president of the Investment Casting Institute, states: "We definitely look forward to doing more commercial work."

New civilian uses are keeping pace with increasing military demands. Cadmet received 60 per cent of its business from government sources this year but expects to have 60 per cent of its production going to the civilian economy in 1957.

Varied Lot—Investment casting parts are found in adjustable golf clubs and rock drills used in coal mines.

They find applications in sewing machines, business machines, textile machinery, fire alarms, cutting tools and valves.

Boosting sales are the increasing knowledge of engineers about the design freedom inherent in the process, the desire to save machining costs and the demand for a better looking product. The trend to miniaturization may add impetus to the switch to investment castings. Additional uses may come from processes combining investment with shell molding.

The Big Ones—The largest castings are made by the frozen mercury process. They include air turbine drives, missile support rings and booster nozzles. The process is used extensively for blades and vanes. Kolcast Industries Inc., Cleveland, is building an 80,000 sq-ft plant in Minerva, O., which will make turbine blades.

GM Plans California Plant

Site preparation for General Motors Corp.'s $50-million assembly plant at Sunnyvale, Calif., will start soon after the first of the year.

John F. Gordon, vice president in charge of body and assembly group activities, says the 1.5-million-sq-ft building is scheduled to be in operation in time for assembly of 1959 models of the Buick, Oldsmobile and Pontiac lines.

Detroit Broach Builds

A 15,000-sq-ft addition is being made to Detroit Broach & Machine Co.'s plant in Rochester, Mich.

Burroughs Boosts Capacity

Construction has started on a factory building at the Tireman avenue plant of Burroughs Corp., Detroit. It will provide 116,000 sq ft of floor space for defense work.

Completion is scheduled for Mar. 1, 1957. About 1200 persons are working at the present plant. When full capacity is reached, the figure will jump to more than 2000.

Allegheny Installs Furnace

High purity zirconium will be melted in the furnace Allegheny Ludlum Steel Corp., Pittsburgh, built in a new melting shop at its Watervliet, N. Y., plant.

The furnace can produce a 2200-lb ingot and has a rated monthly capacity of 50,000 lb. The metal is used in atomic reactors.

E. J. Hanley, Allegheny Ludlum's president, says another zirconium furnace will be put into operation before the end of the year. This will bring ingot capacity to 125,000 tons a month.

Some of the ingots are converted into finished mill products, including strip, bars, wire and forgings.

More Missiles and Jets

Douglas Aircraft Corp., Santa Monica, Calif., has started on a $5-million expansion. It includes a $1¼-million testing facility to be used in production of jet transports and several buildings for guided missiles.

Industry Will Bounce Back

The steelmakers had the roughest going in third quarter earnings, but metalworking felt it, too. Hopes for a record fourth quarter remain high

THE STEEL strike hurt third quarter earnings; you can't deny that (see table). But some metalworking firms still expect to finish out the year with bigger profits than they had in 1955. Some steel companies will better their 1955 sales marks and come close to matching 1955 profits.

Outlook—Take General Electric. Its third quarter profits were more than $8 million ahead of those for the same period last year, sales were $1004 million, compared with $839 million. Roy W. Johnson, head of GE's consumer product group and executive vice president, predicts 1956's sales will climb 18 per cent above 1955's.

Take Republic Steel. Its profits in the third quarter were only about 20 per cent of those in the same quarter last year, sales were off about 30 per cent. But, says Chairman C. M. White, 1956 dollar volume could reach record heights; profits may be only a little below 1955's.

Even Better—Robert H. Morse Jr., president, Fairbanks, Morse & Co., says his firm's income in the third quarter will double that of the corresponding period in 1955. Union Carbide reports its sales are up 5 per cent in the quarter, while both sales and income for the first nine months set records.

Earnings of Allis-Chalmers Mfg. Co. were down 13 per cent in the first nine months, but sales climbed 9 per cent, reports R. S. Stevenson, president.

Despite It All—Caterpillar Tractor's sales were up $28 million in the third quarter, in spite of a two-week shutdown at three Illinois plants because of the plate and structural shortage.

Houdaille's diversification into construction materials and airplane parts promises to pay off in improved third quarter profits. Weaning itself from the boom-and-bust auto business, the firm has cut its automotive line from 20 items to its most profitable six.

RCA registered record third quarter sales, but lower profits from the television receiver division cut over-all company earnings. During the quarter, RCA's television sales were close to last year's level, although the industry suffered a 12 per cent drop. Lower profits are explained by the popularity of portable TV sets: The profit margin on them is less than it is on the big console units.

Aircraft Boom—Increased sales of aircraft products in the third quarter offset lower shipments of auto parts at Thompson Products. More deliveries to the Navy and commercial airlines in the fourth quarter will improve the earning picture of Douglas Aircraft Co. Inc. For the first time in its history, the firm's commercial business is 50 per cent of its order backlog.

Black, Sivalls & Bryson, an equipment producer for the oil and gas industry, expects sales for the year to hit $45 million, compared with $38.1 million in 1955.

Heavy Equipment — Babcock & Wilcox Co. has a record backlog of orders: $350 million. Koppers' earnings dipped in the third quarter because steel mill construction jobs were stopped during the strike. Elliott Co., a power plant and electrical equipment manufacturer, reports backlogs of $35 million at the end of the third quarter, compared with $24.1 million a year ago.

Profits were down for Cleveland-Cliffs because the company had to ship more purchased ore (less from its own mines) in the quarter.

Phelps Dodge Corp. expects to show record earnings for the year: The average price of copper in 1956 will be about 4 cents ahead of 1955's.

Steel Sales Slump

Most steelmakers struck by the United Steelworkers are in the same shape as Republic: Drastically cut earnings in the third; capacity operations in the fourth.

Steel's Third Quarter Profits Drop

SELECTED STEELMAKERS	1956	1955
Acme Steel Co.	$ 885,163	$ 1,412,783
Alan Wood Steel Co.	754,266	714,272
Allegheny Ludlum Steel Corp.	566,445	4,015,512
Barium Steel Corp.	1,929,000	418,000
Colorado Fuel & Iron Corp.	371,389	3,876,841
Continental Steel Corp.	609,370	676,469
Crucible Steel Co. of America	510,226	2,752,293
Kaiser Steel Corp.	6,875,545	2,823,645
Republic Steel Corp.	4,305,948	22,005,740
Rotary Electric Steel Co.	6,427	960,227
Washington Steel Corp.	499,003	574,919
Wheeling Steel Corp.	525,000	4,206,000
Youngstown Sheet & Tube Co.	3,381,000	11,328,000

Metalworking's Third Quarter: Fair

SELECTED MANUFACTURERS	1956	1955
Acme Precision Products Inc.	$ 164,812	$ 73,727
Black, Sivalls & Bryson Inc.	700,594	234,562
Buffalo Forge Co.	416,915	340,297
Caterpillar Tractor Co.	12,878,136	9,035,000
Central Foundry Co.	231,153	322,335
Cleveland-Cliffs Iron Co.	4,060,009	4,960,823
Climax Molybdenum Co.	2,905,705	4,490,614
Container Corp. of America	4,262,000	4,072,000
Continental Can Co.	11,361,000	9,859,834
Cooper-Bessemer Corp.	1,362,000	462,000
Daystrom Inc.	589,000	484,000
Diamond Alkali Co.	2,482,431	2,210,273
Driver-Harris Co.	141,539	147,156
Elliott Co.	238,540	457,360
Ford Motor Co.	13,500,000	77,800,000
General Electric Co.	47,863,000	39,467,000
Houdaille Industries Inc.	545,226	364,531
Howe Sound Co.	588,536	842,097
Hussmann Refrigerator Co.	913,587	791,355
Intertype Corp.	289,638	334,699
Koppers Co.	2,496,508	2,628,064
Glenn L. Martin Co.	2,868,790	3,671,531
McDonnell Aircraft Corp.	1,738,978	1,234,574
Minneapolis-Honeywell Regulator Co.	4,995,083	4,295,996
Monarch Machine Tool Co.	235,350	146,229
National Distiller Products Corp.	4,409,110	4,002,857
National Lead Co.	12,537,724	10,704,761
Parker Appliance Co.	335,706	13,646*
Pennsylvania Salt Mfg. Co.	790,865	687,486
Pittsburgh Forgings Co.	62,538	40,741
Pittsburgh Screw & Bolt Corp.	270,248	201,471
Radio Corp. of America	7,856,000	8,934,000
Ronson Corp.	703,442	440,535
Thompson Products Inc.	2,703,377	2,218,393
Udylite Corp.	527,559	430,377
Underwood Corp.	5,866,520*	500,011
Union Carbide & Carbon Corp.	32,148,446	37,821,591
Victor Equipment Co.	140,113	128,329

*Net loss

Real Cost — Crucible's sales during the quarter dropped to $44 million from $76 million in the June quarter and $57 million in the third quarter last year. But President Joel Hunter expects earnings for the year to match 1955's.

Despite the strike, says Lukens Steel Co., "we'll have a record year in sales and earnings."

Youngstown Sheet & Tube reports sales of $112 million in the quarter, compared with $160 million last year. Shipments were about half those of the preceding quarter, while ingot operations averaged 56.3 per cent of capacity.

Allegheny Ludlum's sales fell to $48.8 million, compared with $65 million in last year's third quarter.

Alan Wood was one firm not touched by the big strike (although there was a strike in the company's mining division). Sales climbed to $17 million, compared with $15.5 million in 1955's September quarter. The firm will probably run at capacity through the first quarter of 1957.

Acme Steel (which recently purchased Newport Steel to become a fully integrated mill) expects the fourth quarter to be the best in its history.

Summing Up—Optimism in the steel industry stems from the points of view of its customers.

"We're optimistic about the next 24 months," says GE's Mr. Johnson. The auto industry expects production in 1957 to be between 6.5 million and 7 million autos. International Harvester Co. looks for increased farm implement sales. Peter V. Moulder, president, says IH's sales should climb 10 per cent next year. And the federal road program (see page 79) will begin to be felt soon.

Texas Gets Can Factory

American Can Co., New York, will build a factory in San Antonio, Tex. Its capacity: 275 million cans a year for beer and food products.

Steel Fabricator Expands

Herrick Iron Works, Oakland, Calif., will put up a $1-million building at Hayward, Calif. Employment will rise from 235 to 300 by next year, according to Stephen G. Herrick, president.

Fast Tax Timing Gets Byrd As Decision Is Delayed

QUICK action on industry requests for fast tax write-offs on $1.5-billion worth of steel expansion is more unlikely than ever. Until last week, Defense Mobilizer Flemming had timetabled a decision for sometime between mid-December and mid-January—with the later date more probable. Now, Sen. Harry F. Byrd (Dem., Va.), chairman of the Senate Finance Committee, has asked that any decision be put off until his committee has time to look the problem over. Says Senator Byrd: "It is my belief that under present peacetime conditions such special privilege can be justified only in exceptional and rare cases. Otherwise, there is a danger of creating unfair competition and over-expansion, and damage to small business. I am concerned also about the temporary loss of revenue resulting from these cases." Senator Byrd is talking for many legislators. Even if a Republican senate is elected next month, this type thinking could predominate.

Home Loan Policy: No Change Seen

Administration officials are keeping a wary eye on the nation's home-building picture, but they show few, if any, signs of retreating from the present anti-inflation, tight money policy. As far as home builders are concerned, any action must come soon if it is to give relief. Builders are already laying spring plans. But the industry generally is against proposals that would have the government move farther into housing by offering direct loans in areas hard pressed for mortgage funds. Reason: A feeling that government already has too big a finger in the housing pie.

New Push for Zirconium

Keep an eye on zirconium. The Bureau of Mines has started a $110,000 research project financed by the Atomic Energy Commission. It's aimed at recovering zirconium from impure sponge, mill scrap and alloys. If a commercially accepted process is developed, it could lead to lower metal prices and more nonmilitary uses. The AEC is practically the only user today.

Scoreboard on Hoover Recommendations

About two-thirds of the 479 Hoover recommendations to improve the efficiency of the federal government have been accepted. Latest report shows that 22 per cent of these have been put into effect and another 40 per cent are being adopted. About 9 per cent will have to wait for legislative action. The remaining 29 per cent will be put into effect as soon as possible (some of them were finally approved only recently). Some of the most important recommendations still hanging fire require congressional action. President Eisenhower has promised specific legislative proposals for the next session of Congress.

War Potential Assessed

Capacities of two metalworking industries — metal strapping and power switches — will be surveyed for their defense potential. The Business & Defense Services Administration wants to know how much they can produce under emergency conditions. Members of BDSA's industry advisory committees for those industries will make the checkups.

Lower and Slower

While efforts to make airplanes go higher and faster get the headlines, the Army is concentrating on making them go lower and slower. Aim: To operate from small, front-line fields. It's felt that vertical take-off aircraft meeting Army's cargo carrying needs can be flying by 1960.

Better Choppers Urged

Bigger helicopters using turboshaft engines (jet engines harnessed to drive the rotors) are being urged by Army and civilian groups. Eliminating the piston engine with its built-in vibration hazard will reduce maintenance costs, say engineers. The new engines will have better horsepower-weight ratios, permit bigger payloads. Better instruments for bad weather flying are being urged also.

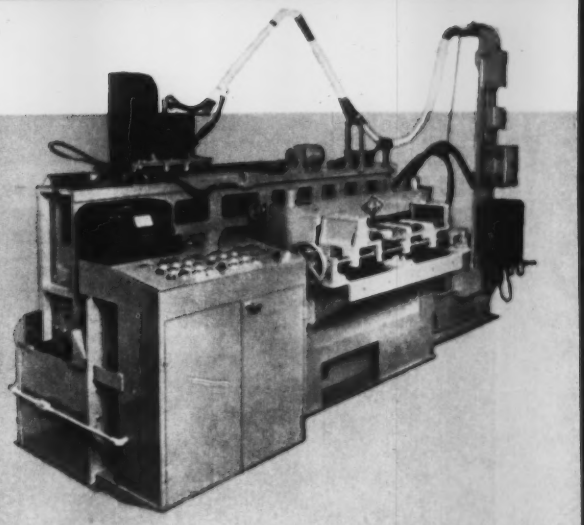
Washington Whispers

• The Small Business Administration and the Commerce department are working together to give more Commerce department business to small firms. The program is similar to those already in use at the Defense department and other agencies.

• Northern Ordnance Inc., Minneapolis, has a $23-million Navy contract to produce Terrier guided missiles. . . Commerce department has signed up 200 executive reservists to serve in government agencies in emergencies. Goal of the executive reserve program is estimated at about 500 men.

THE NEW

MPM Shear Welder



CONTINUOUS SILICON SHEET PRODUCTION

Shearwelder for coil build up line for 42" wide Silicon Steel from .015" to .030" thick.

HEAVY GAUGE STAINLESS PRODUCTION

Shearwelder for butt welding 60" wide x .250" thick Stainless Steel.

.....more automation for even faster Steel Production!

● Metal Processing Machine Company's new Shearwelders are outstanding because of their advanced design incorporating automatically sequenced operations.

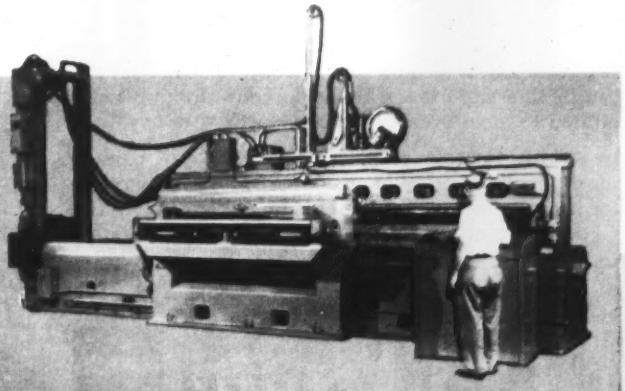
Shearing and welding are performed at the same station with positive clamping right at the work area, thereby insuring perfectly aligned butt welds.

"M.P.M." welds are **extremely ductile,** permitting subsequent rolling, forming, or blanking operations. Weld joints are smooth and require **no trimming.**

Rugged construction is insurance for minimum maintenance and compact design saves floor space.

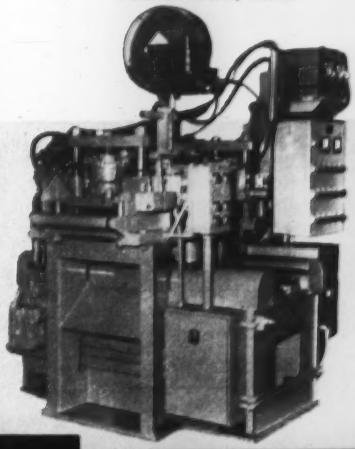
THE METAL PROCESSING MACHINE CO.

DIVISION OF McKAY MACHINE CO.
YOUNGSTOWN, OHIO



MAJOR COIL BUILD UP

Shearwelder for Carbon Steel coil build up line for .015" to .060" thick x 72" maximum width.

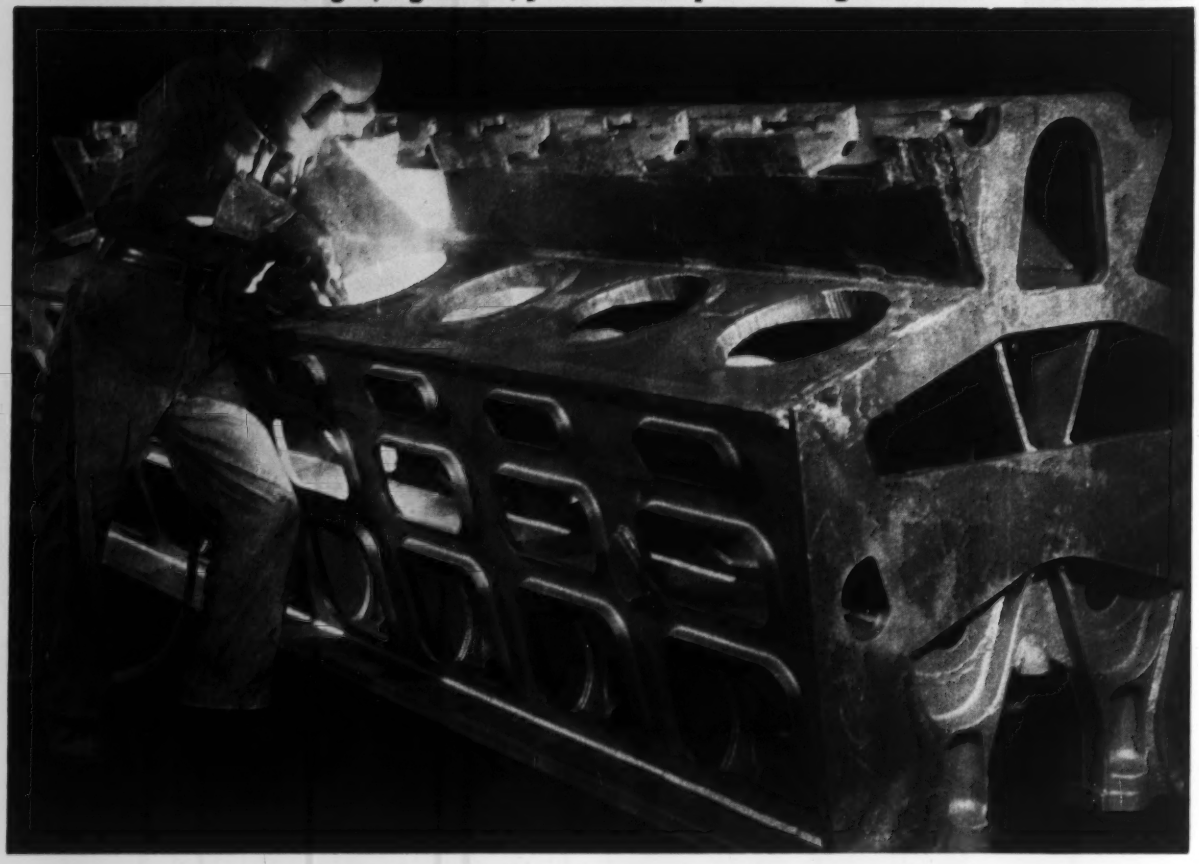


CONTINUOUS TUBE MILL PRODUCTION

Shearwelder used with strip looping device for splicing coil to coil to permit continuous production of tube mill.

10065

WELDMENTS for strength, lightness, predictability and design freedom—at lower cost!



DIESEL ENGINE FRAME: Weldments of this type have been responsible for weight savings as high as 32% with no sacrifice in strength and safety. Superior shock resistance protects engine performance. Maintenance costs are reduced and significant economies realized.

HERE'S THE STORY OF QUALITY BEHIND EVERY LUKENWELD WELDMENT

Lukenweld's extensive production facilities and experience add up to this: no matter how big, tough, or challenging the job, you get exactly what you want—on time—and at a cost that will fit your plans.

DEPENDABILITY The predictability and rigidity of welded structures plus Lukenweld's specialized knowledge of design and materials selection assures equipment that will perform efficiently, longer.

RELIABLE SOURCE OF MATERIALS Carbon, alloy and clad steel plates in the widest range of types and sizes available anywhere are obtainable "right next door"—from the Lukens rolling mills.

CONSULTATION SERVICE Metallurgical, design engineering, related services are available on your job.

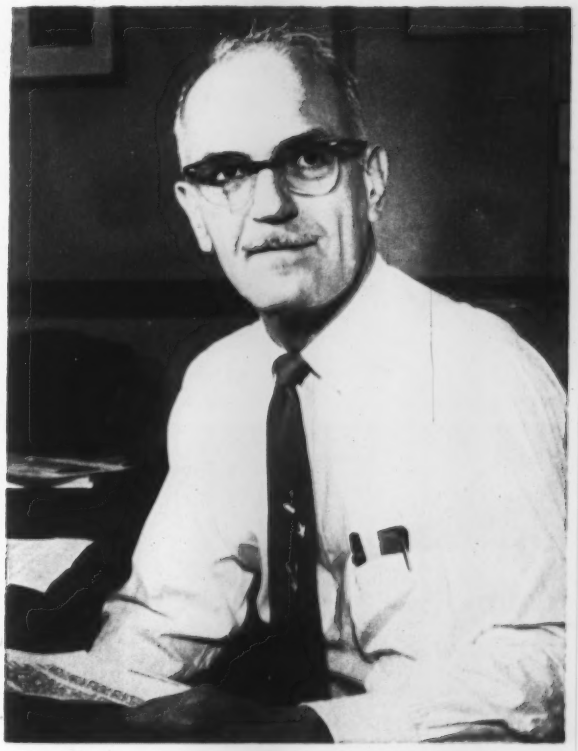
FINISHING FACILITIES Modern heat treating, machining and other finishing facilities are your assurance of complete quality control from steel plate to finished weldment—ready for assembly in your equipment.

EXPERIENCE Lukenweld, the first commercial weldery in the U.S., pioneered many advances in welded construction. Knowledge and craftsmanship gained through this experience make Lukenweld unusually qualified to meet your weldment needs.

FOR INFORMATION on how Lukenweld can answer your particular weldment problems or for a copy of the informative booklet, "Weldments by Lukenweld," write on your company letterhead to Manager, Marketing Service, 819 Lukens Building, Coatesville, Pa.

LUKENWELD LUKENS

A DIVISION OF LUKENS STEEL COMPANY
COATESVILLE, PENNSYLVANIA



Hall's Partridge: Water Expert

"ARE WE MANAGING our water supply properly?" asks industry.

Thirty-one years of study qualifies Dr. Everett P. Partridge to answer. He's director of Hall Laboratories Inc., Pittsburgh.

Service—"The question is one industry is just beginning to ask," comments Dr. Partridge. Last year his firm enjoyed a 10 per cent gain in clients; it now serves over 2500 industrial firms and has outgrown its original purpose as a subsidiary (of Hagan Corp.) consulting organization on boiler water conditioning.

"We study every industrial water problem from procurement to disposal," explains Dr. Partridge. "We're basically chemical engineers, backed by specialists in such fields as chemistry, microscopy, metallography and bacteriology, and in such industries as steel, textiles and paper."

Much of the work involves the development of facts which help a firm come to grips with its water problems. Hall's experts then think the problem through with the client's engineers.

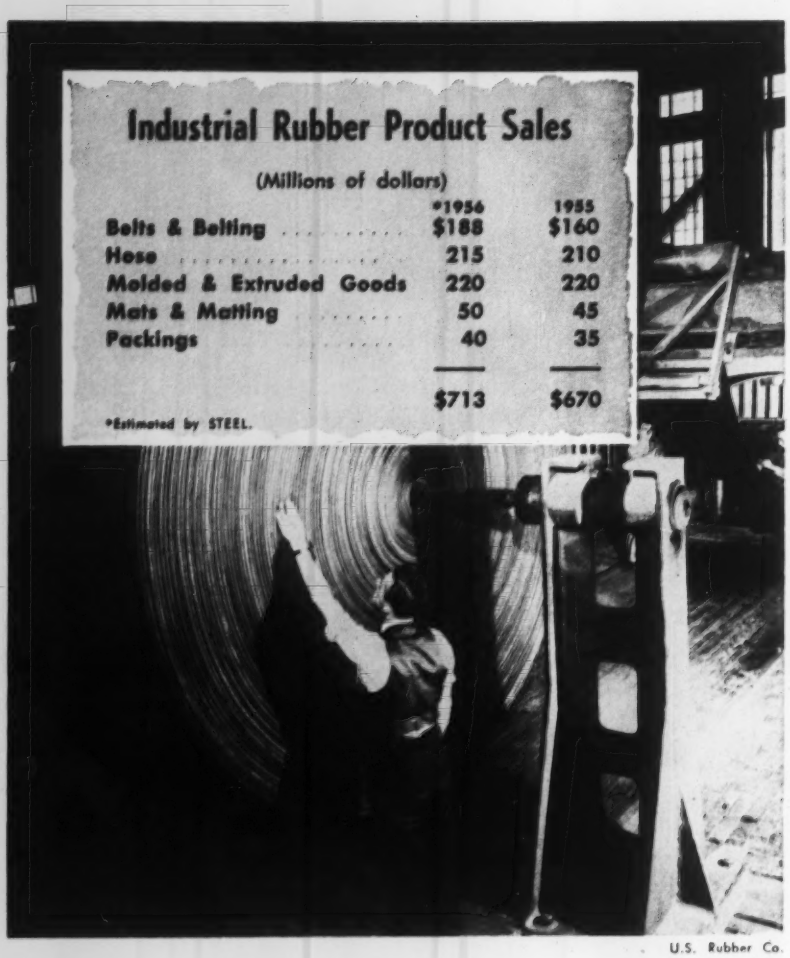
Typical—Dr. Partridge uses this example: "A steel fabricator wanted to expand but already had a water shortage. How was it possible to expand?" Hall engineers studied the plant's use of water for six weeks before suggesting conservation methods and locating a new water source.

It takes 100 tons of water to make 1 ton of steel; so water is one of the industry's most important raw materials, reasons Dr. Partridge. "We try to catch water contamination at the point of origin; half our job is discovering that point," he says.

Hall Laboratories also maintains systematic supervision of water use by clients for boiler feedback, cooling and in-plant processes. Hall engineers are on the job throughout North America.

Background—Dr. Partridge joined Hall in 1935 after serving in a Bureau of Mines experiment station. His work there included the discovery of an improved chemical means of preventing embrittlement of steel by boiler water.

When his work permits, he is active in community and technical society affairs. He will deliver the Marburg lecture before American Society for Testing Materials next June. Then next summer he'll take a band of explorer scouts to Canada (it's an annual affair).



U.S. Rubber Co.

Industrial Rubber Gains

More specialized applications in electronics and aircraft are sparking the trend to synthetic compounds. The net result: Sales may climb 10 per cent next year

THE DROP in automotive demand hurt sales of industrial rubber goods a little this year: Compared with a 12 per cent increase from 1954 to 1955, this year's sales will top 1955's by about $40 million, a 6 per cent improvement (see table).

Outlook for 1957: If the overall economy is strong, a 10 per cent boost is possible. A year as good as this one seems to be a certainty.

Molded, Extruded — Some producers less dependent on automotive business enjoyed a 10 per cent jump in sales this year. Yale Rubber Mfg. Co., Sandusky, Mich., looks for an 8 per cent gain next year (after a 10 per cent increase this year), and predicts molded and extruded goods will lead the parade.

Rubber roll manufacturers increased sales 10 per cent this year and expect to add another 10 per cent next year. Tyer Rubber Co., Andover, Mass., produces standard and special covered rolls weighing a few ounces to 20 tons. Says Wallace E. Brimer, president: "We note an increasing use of rubber rolls in plastics, paper, textiles, leather and packaging industries."

Rubber, Steel—Around Akron, the talk is of more molded products where rubber is combined with steel. Firestone Tire & Rubber Co. cites air springs for autos, trucks and industrial applications. Wire reinforced hose, compass steel belts and wire for tires make this Ohio city one of the leading markets for wire.

B. F. Goodrich Co.'s industrial division reports that more steel wire is being used for hose reinforcement and that the paper and steel industries are using more steel cable belts and rubber covered steel rolls.

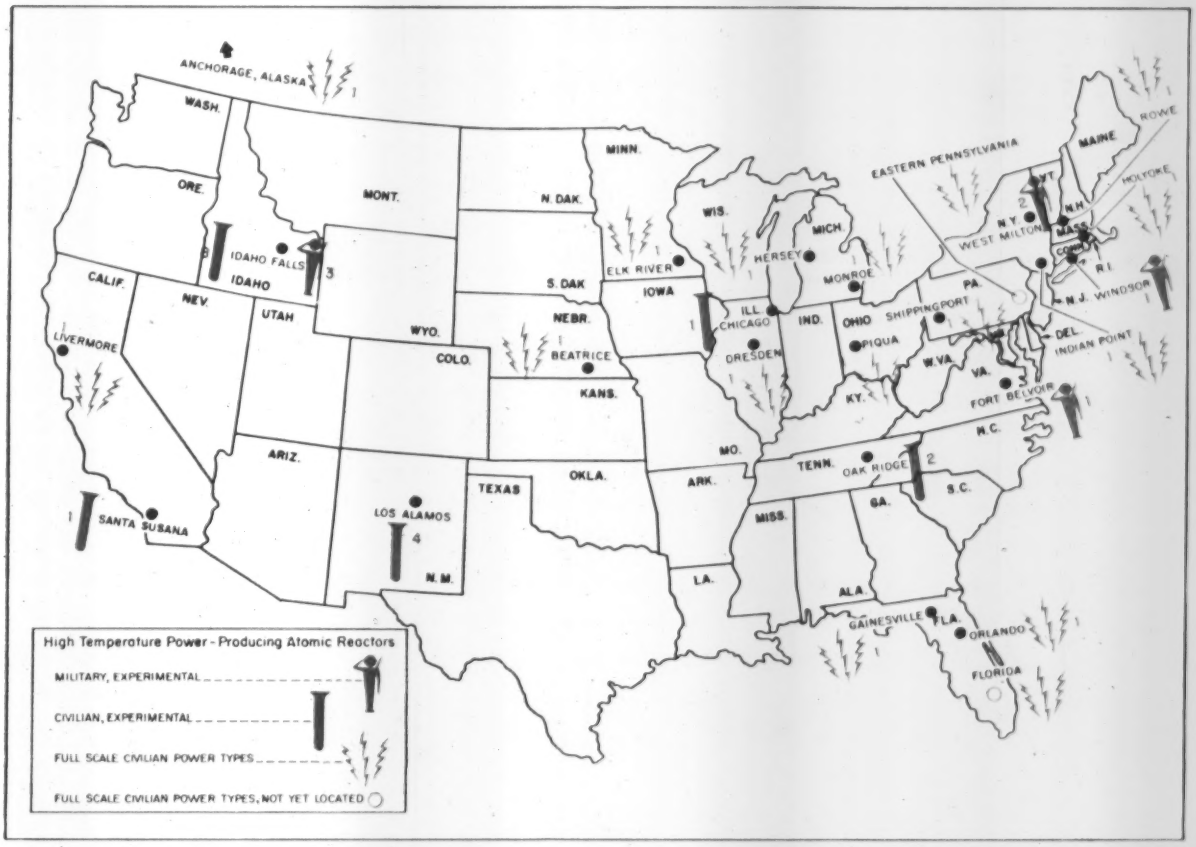
Besides automotive, the steel, construction and mining industries are leading consumers of belting and hose. Hewitt-Robins Inc., Stamford, Conn., reports 1957's volume should go up another 5 to 10 per cent, after an 8 to 15 per cent increase this year.

Natural, Synthetic—Yale Rubber notes a trend to more synthetic compounds in molded and extruded products. In Akron, large fabricators believe the use of synthetic or natural rubber depends largely on price, except in the case of oil resistant applications and other special uses.

Natural crude rubber is going at 35 cents per pound today, compared with an average of 40 cents in 1955. Since the transfer of the synthetic rubber industry to private hands, notes an Akron source, upward price adjustments in general purpose synthetic have been small and irregular.

New Trends—Sales of extruded and fabricated silicone rubber seals for aircraft are up 10 per cent at Connecticut Hard Rubber Co., New Haven, Conn. The firm is installing new equipment to handle heavier sales in 1957. Connecticut also sees more applications for seals in electronics.

Acushnet Process Co., New Bedford, Mass., is active in home appliances, where it notes a trend to more synthetic rubber applications. A silicone and Dacron hose has been developed by H. K. Porter Company Inc. (Quaker Rubber Division), for the pneumatic starting of jet engines.



Mapping Atomic America

WITH a nice sense of timing the Atomic Energy Commission last week made public the details of nuclear reactors "built, building, or planned in the U.S."

Countering political charges that it has been sitting on atomic development, the AEC pointed to 214 nuclear reactor projects initiated since 1942. The announcement is also calculated to boost U.S. prestige internationally. Earlier last week, Queen Elizabeth closed a switch to feed nuclear power from Britain's first full-size atomic plant into the national grid.

Development—Fourteen of the 214 reactors have served their purpose and have been torn down. Another 68 are in operation. Another 49 are being built, and 83 are in the planning stage.

Of major interest are the full-scale civilian power reactors. The first is scheduled to light up at Shippingport, Pa., next year. Another will come in at Livermore, Calif., in 1958. In 1959, there'll be two more, one at Hersey, Mich., the other at Gainesville, Fla. Six are scheduled for 1960, three for 1961 and three for 1962.

U.S. companies, says the AEC, are also planning six full-scale power reactors for overseas customers. Westinghouse Electric Corp., Pittsburgh, is supplying one to Belgium; Glenn L. Martin Co., Baltimore, another to the Dominican Republic. Preliminary arrangements to sell four other reactors to Latin America and the Philippines have been made by General Electric Co., Schenectady, N. Y., and Atomics International Inc., New York.

Retaliation—The armed services are playing a strong hand in the power producing reactor business. In addition to those installed in the *Nautilus* and *Seawolf*, eight more submarine reactors are being built. In the planning stage are a twin-reactor guided missile cruiser, an eight-reactor aircraft carrier, the army power package, and six other submarine jobs.

Research — High temperature power reactors are only one phase of the over-all program, points out the AEC. There's also a complete series of low temperature units which don't produce power.

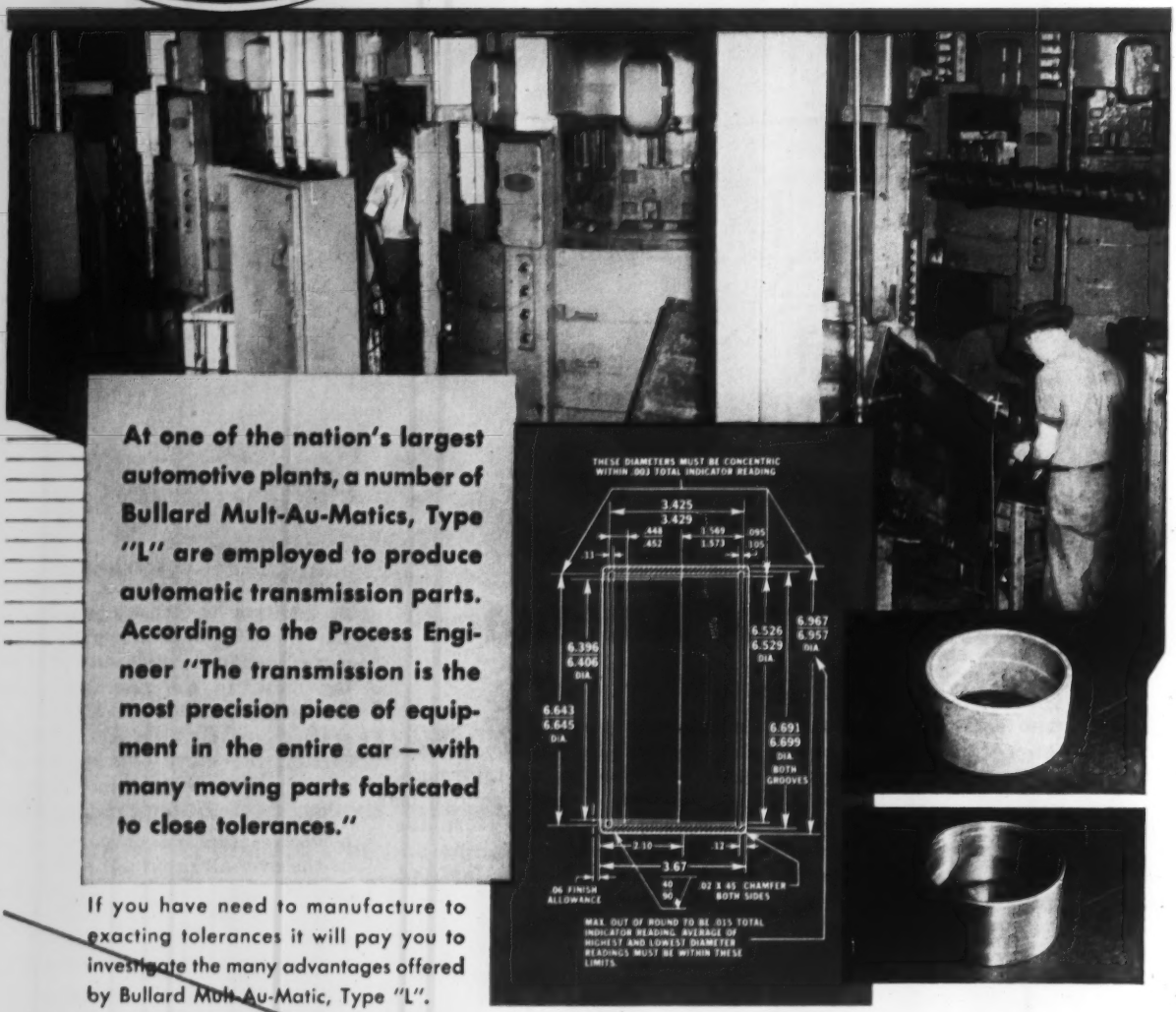
At Hanford, Wash., and Aiken, S. C., 13 of these are turning U-238 into plutonium. There are 42 more for critical experiments and zero power work (testing core designs, etc.). Still others are at work around the U.S. in general research centers for medical, material and other tests and for personnel training.

Verdict—In terms of the diversity and number of nuclear programs, there's no doubt that we are ahead of any other country.

Automobile Manufacturer produces

Repetitive Pieces to Close Tolerances with

BULLARD MULT-AU-MATIC Type "L"



At one of the nation's largest automotive plants, a number of Bullard Mult-Au-Matics, Type "L" are employed to produce automatic transmission parts. According to the Process Engineer "The transmission is the most precision piece of equipment in the entire car — with many moving parts fabricated to close tolerances."

If you have need to manufacture to exacting tolerances it will pay you to investigate the many advantages offered by Bullard Mult-Au-Matic, Type "L".

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1957 Plymouth Belvedere sport coupe comes in 215 or 235-hp engine ratings

Average 1957 Auto Will Contain:

	Aluminum	Stainless
Ford's cars	35 lb	35 lb
GM's cars	60 lb	33 lb
Chrysler's cars	78 lb	28 lb

Estimated by STEEL

Aluminum, Stainless Gain

If 1957 automotive consumption estimates hold, use of aluminum next year will be 190 per cent greater than it was in 1950. Stainless steel's consumption will climb 61 per cent

ALUMINUM'S spectacular gains in automotive applications tend to obscure the fact that stainless steel has made substantial advances, too.

Take a look at these comparative figures which show the net tons of each metal used in the automotive industry:

	Aluminum	Stainless
1957	142,000	132,000
1955	116,000	142,800
1950	48,950	81,800

Estimates—The 1957 figures are estimated, of course, on the assumption that 6.8 million autos will be turned out. Nearly 7.4 million cars would have to be produced next year before stainless consumption would top the 1955 record. However, stainless' use per car will be about 4 lb higher in 1957 than it was in 1955.

Aluminum Co. of America says that the average weight of aluminum per car jumped from 29.6 lb in 1955 to 35.2 lb in 1956. Estimates from aluminum people add another 7 lb to the average 1957 models.

Up and Up—If the 1957 estimates come true, aluminum consumption by the automotive industry will have jumped 190 per cent since 1950. Stainless use will be 61 per cent higher. Both metals have made heavy inroads into the tonnage of plated parts.

But one factor that has hurt the use of plated metal, the shortage of nickel, also works against stainless.

Talk about the two metals came up two weeks ago at the annual technical convention of the American Society of Body Engineers at Detroit. Proponents of stainless and aluminum made their claims. Consensus: Stainless' brightest future is for trim items and smaller parts. It always will find a ready market on higher priced autos. Aluminum has a good tonnage future in some body panels and for parts like wheels, such as those on the Eldorado. Its lightness even may overcome other cost barriers in applications where unsprung weight is vital.

Stainless—"High strength, corrosion resistance, heat resistance and surface appearance are the important reasons for the widespread use of stainless steel today," declares Jon W. Hauser, industrial designer, Jon Hauser Associates, St. Charles, Ill. Mr. Hauser spoke

on stainless steel for structural automotive parts.

He believes stainless can be used economically in structural panels such as corner posts and pillars. In such applications, it would do away with the need for plating or adding other ornamentation, cut down weight and be just as strong.

Aluminum—E. P. White, head of the automotive section of Alcoa's sales development division, cites his reasons why auto engineers use aluminum: It is strong and durable, light, competitive in price, readily obtainable and easily fabricated with forms, textures and finishes not readily available in other materials.

Adds Mr. White: "It is interesting to observe that (except for door handles) every single piece of 'brightwork' on automobile exteriors will be in aluminum on one car or another in 1957."

Cost—Mr. Hauser quotes Chrysler Corp. breakdowns on the cost of parts which show that although stainless originally is more expensive, its fabricating and finishing costs are cheaper than those of aluminum.

Present manufacturing techniques and tooling favor stainless, but developments in the diecasting and cold forming of aluminum may make for a complete turnabout in the cost picture.

Look Ahead — Product planning sections of all aluminum companies are thinking in much larger terms than the present fad for anodized aluminum trim. Dr. George Perkins, general director of the Reynolds Metals Co. product development department, made that point clear for ASBE members, stating:

"The conventional fender (for example) is a painted steel sheath over built-up reinforcing, with chromium plate, stainless steel or aluminum trim overlaid on the fender surface—a costly item consisting of a number of parts and several forming and assembly operations.

"Consider instead, an aluminum fender section, quarter panel, hood or roof that is designed to include trim strips, emblems, lettering and reinforcing ribs or corrugations in a single sheet of metal.

"Raised or embossed areas designed as trim could be masked while the balance of the section is enameled. Additional enameling or lacquering of emblems in several colors may be completed by conventional methods."

Such ideas are feasible, but would call for radical tooling programs. Auto makers prefer to move one step at a time in this direction. Similar ideas advanced by stainless advocates would require just as much tooling.

Into the Future—Stainless will appeal to manufacturers for many small items and a few larger ones, particularly on luxury cars.

The biggest stainless part made today is the brushed stainless steel top on Cadillac's Eldorado brougham. (Aluminum people hint that they already have similar designs in the works for other '58 or '59 cars.) Stainless mufflers on Continental Mark II class cars in a year or two are a distinct possibility.

McCord Radiator Gets Nod

Radiators with stainless steel top and bottom tanks and headers are being made for the Mercury Division of Ford Motor Co. The radiator cores have aluminum fins brazed to brass tubes.

McCord Corp., Detroit, and Allegheny Ludlum Steel Corp., Pittsburgh, co-operated on design and development. Initially, 10 per cent of 1957 Mercury production will be equipped with this type unit.

L. L. Hunt, chief engineer at McCord, says SAE 430 stainless is used in the tanks and headers. It replaces brass which is on the critical list. Indications are that most of FMC's radiators will be of this design in 1958.

The average radiator costs $18 to $20. Using stainless cuts manufacturing costs 3 to 4 per cent. It's understood that Ford also will convert oil coolers to stainless steel during the 1957 model run. The coolers fit in the bottom radiator tank—almost 90 per cent of Ford's are made of cupro-nickel at present. Nickel shortages dictate the switch.

Talking about aluminum fins, Mr. Hunt reports that McCord has developed a flux which makes it possible to braze the aluminum to brass tubing. "Joints between the fins and tubes must be protected from electrolytic action. We use a chemical coating which makes the cores last longer than all brass or all copper systems," he states.

Mr. Hunt believes that all-aluminum radiators eventually will be used. Most engineers agree that while this construction is practical, cheaper manufacturing techniques must be developed. Experts think it will be possible to cut radiator manufacturing costs as much as 30 per cent by using aluminum.

U.S. Auto Output

	Passenger Only 1956	1955
January	612,079	659,508
February	555,596	675,495
March	575,234	794,015
April	547,766	753,851
May	471,533	724,892
June	430,279	649,393
July	448,804	659,763
August	401,996	614,493
September	190,709†	461,591
9 Mo. Total	4,233,996†	5,993,001
October		517,813
November		749,061
December		682,257
Total		7,942,132

Week Ended	1956	1955
Sept. 22	35,652	123,109
Sept. 29	43,369	115,723
Oct. 6	59,351	80,271
Oct. 13	70,175	101,581
Oct. 20	91,740†	137,425
Oct. 27	107,250*	158,430

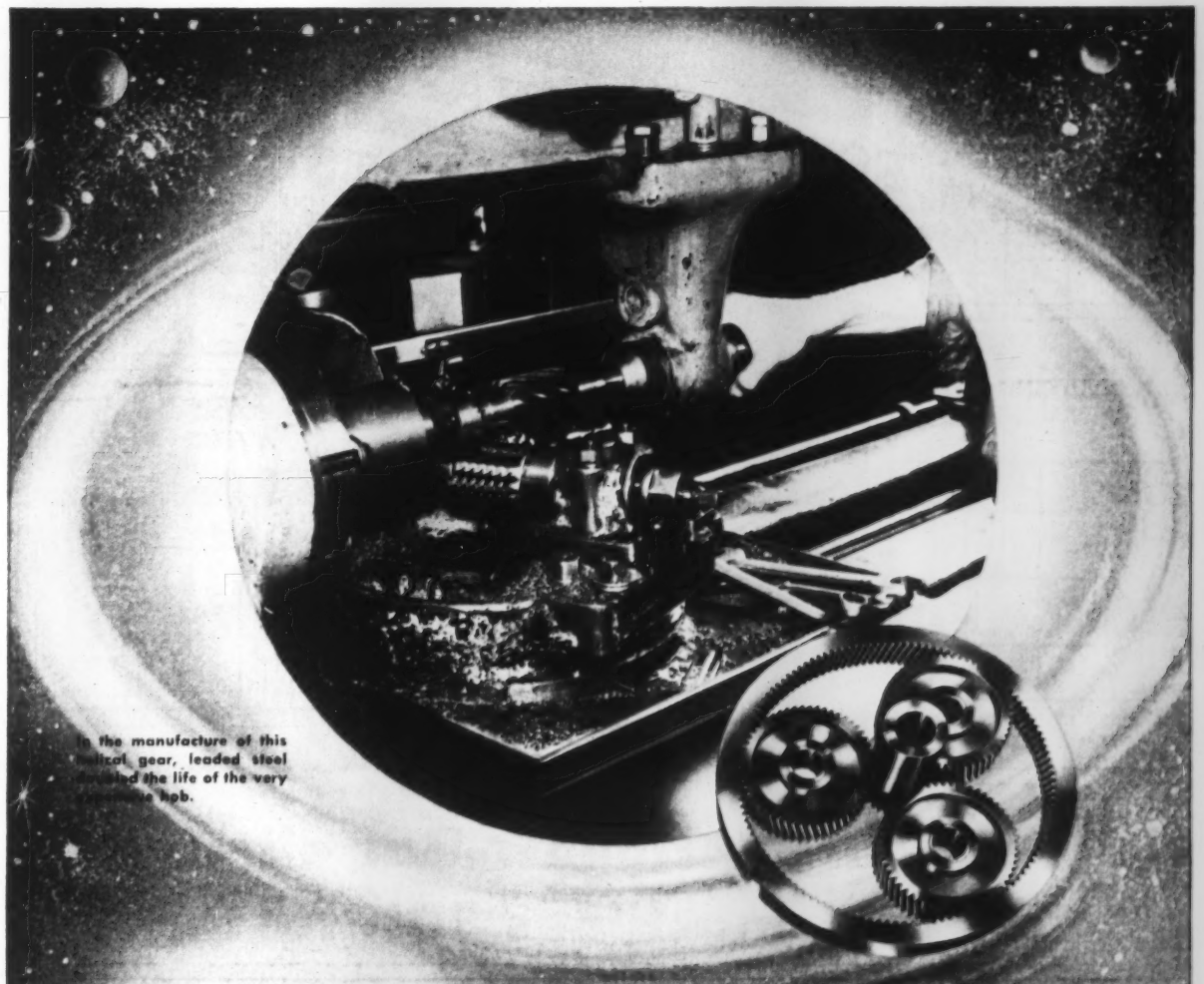
Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Exhaust Notes

• **Strong Demand** — Talk about town has it that as of Oct. 12 Ford dealers around the country had received earnest money for 185,000 new model Fords. By the same date, about 68,000 new models had been produced.

• **Sales Pitch**—Chrysler Corp. announces it has set up a corporate marketing organization responsible for all divisional products. Biggest sales push will be behind Plymouth as it starts a make-or-break attempt to unseat Buick from third place in the sales race.

• **Top Secret**—Rumors about the grille on Ford's E car are still flying around. It's still oval, according to latest reports, but the material has switched from anodized aluminum to zinc; it will weigh more than 13 lb.



In the manufacture of this helical gear, leaded steel doubled the life of the very expensive hob.

Another star in this production is

COPPERWELD LEADED STEEL

For many years, The Philadelphia Gear Works has been a leader in the field of making gears of all types, from the very simple to the most complex, precision assemblies.

The faster feeds and speeds with which leaded steels can be worked give them an average decrease in production time of 30%. In some cases production time was decreased by as much as 68%.

In many cases, the life of expensive cutting tools was increased 100%.

Often the finer finish of Copperweld Leaded Steels reduced the final de-burring and polishing operations. Truly, Copperweld Leaded Steel is the steel with "built-in productivity."

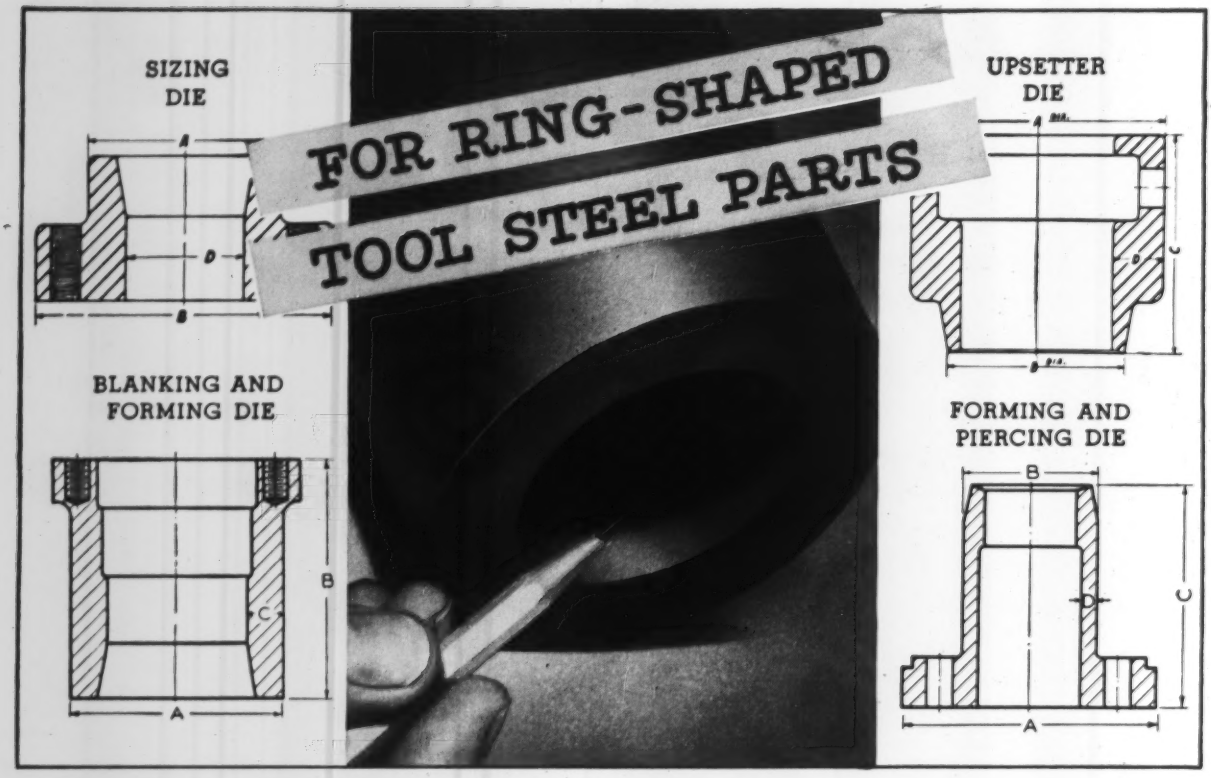
ARISTOLOY STEELS

COPPERWELD STEEL COMPANY
Steel Division • Warren, Ohio

EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N.Y.

For further details on Copperweld Leaded Alloys, write for free booklet, "Lead Treated Steels."

LEAD TREATED STEELS



New Graph-Mo Hollow-Bar eliminates drilling, machines 30% faster

MAKERS of ring-shaped tool steel parts who use Graph-Mo Hollow-Bar will tell you it speeds up production, cuts down waste, and saves steel. That's because the hole is already in it. There's no drilling, you start with finish boring.

What's more, you get all the proved advantages of Graph-Mo that have made it one of the most popular tool steels—excellent machinability, wearability, and stability.

Graph-Mo machines 30% faster than other tool steels and has a minimum tendency to scuff or gall. The combination of free-graphite and diamond-hard carbides in its structure gives it exceptional wearability. Users report that Graph-Mo outwears other tool steels on an average of 3 to 1.

Graph-Mo also is the most stable tool steel ever made. For instance, a Graph-Mo steel master plug gage showed less than 10 millionths of an inch in dimensional change after 12 years of use. And Graph-Mo responds uniformly to heat treatment, too.

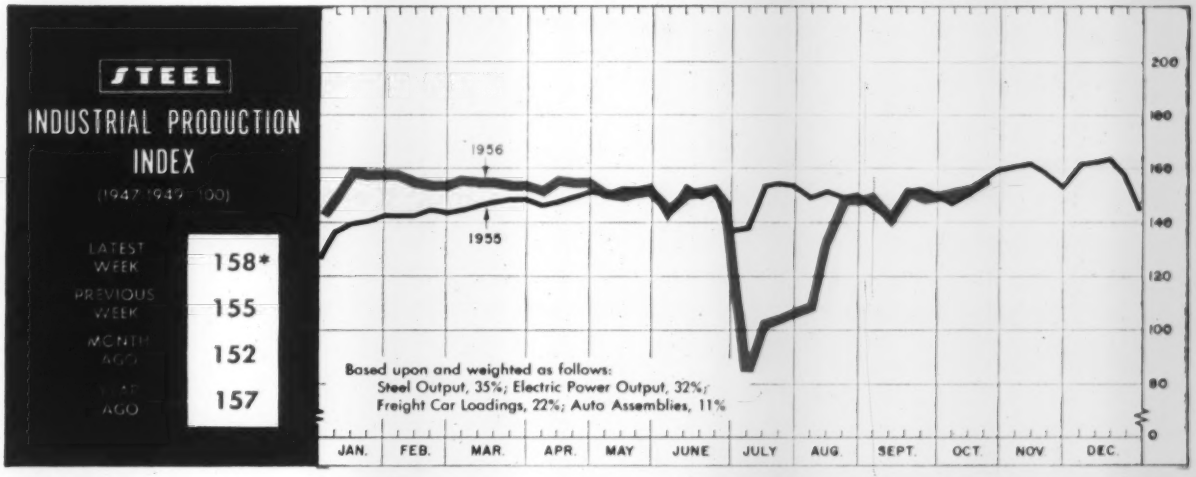
If you make ring-shaped tool steel parts, make sure you get all the advantages of Graph-Mo Hollow-Bar. Sizes range up to 16" O.D. with a variety of wall thicknesses. It's made by the specialists in fine alloy steels, The Timken Company.

Graph-Mo Hollow-Bar is distributed through A. Milne and Co. and the Peninsular Steel Co. warehouses.

To find out more about this tool steel, write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



*Week ended Oct. 20

Industrial Production Hits Record Stride

INDUSTRIAL production is sprinting down the home stretch at a record pace. While the big push is coming from steel mills and automotive plants, practically all segments of industry are contributing to the fourth quarter dash.

STEEL's industrial production index (above) bristles with strength. In just one month, it gained 6 percentage points, from 152 for the week ended Sept. 22 to a preliminary 158 for the week ended Oct. 20 (1947-1949 = 100). The significant point is that this occurred while the auto industry, which accounts for 11 per cent of the index, was at its lowest level in several years. This highlights the really tremendous pace at which the rest of industry has been traveling, especially metal fabricating. Demand for steel has kept the nation's mills operating at better than 100 per cent of capacity for the last seven weeks.

The Odds—Pushing for a production record is something like running the 4 minute mile; the home stretch is the longest and hardest part of the race. The record for STEEL's index is 164, registered during the week ended Dec. 17, 1955, when the economy was stretching its capacity almost to the breaking point. In the ten months since then, expansion has beefed up capacity, so that it should be no trick to come near the previous high mark. But let's take a look at what it will require to chalk up those last two or three points.

Most of the effort will lie with the auto producers. During the week ended Oct. 20, the output of cars and trucks passed the 100,000-unit mark for the first time in nine weeks. Auto makers will almost have to double this rate to come even with the typical fourth quarter week of last year.

A Lot of Doing—This extra production in Detroit will put an even greater strain on the steel mills. Before the year is out, production of 2.5 million tons of steel ingots a week will be commonplace. It has happened only twice. Produc-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,489[1]	2,495	2,413
Electric Power Distributed (million kw-hr)	11,350[1]	11,300	10,644
Bituminous Coal Output (1000 tons)	10,225[1]	10,410	9,808
Petroleum Production (daily avg—1000 bbl)	7,000[1]	6,990	6,753
Construction Volume (*ENR*—millions)	$446.6	$390.2	$419.9
Auto, Truck Output, U. S., Canada (*Ward's*)	121,288[1]	96,986	169,191
TRADE			
Freight Car Loadings (1000 cars)	820[1]	823	834
Business Failures (Dun & Bradstreet)	259	253	203
Currency in Circulation (millions)[3]	$30,953	$30,884	$30,621
Dept. Store Sales (changes from year ago)[3]	+5%	+2%	+8%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$20,847	$19,676	$24,116
Federal Gross Debt (billions)	$273.9	$273.9	$280.0
Bond Volume, NYSE (millions)	$15.1	$14.9	$15.9
Stocks Sales, NYSE (thousands of shares)	8,176	7,407	8,666
Loans and Investments (billions)[4]	$85.3	$85.7	$86.1
U. S. Govt. Obligations Held (billions)[4]	$25.7	$26.0	$31.4
PRICES			
STEEL's Finished Steel Price Index[5]	225.58	225.58	208.90
STEEL's Nonferrous Metal Price Index[6]	265.4	265.0	263.9
All Commodities[7]	115.1	115.0	111.2
Commodities Other Than Farm & Foods[7]	123.0	123.0	118.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,893; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

Coming

Nov. 12

IN

STEEL

INDUSTRY and COLLEGE—

Partners in Development

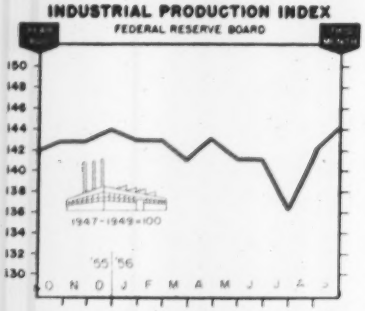
This year there were at least twice as many openings in industry for college graduates as there were grads available. Want to know how you can team up with the colleges to beat the shortage of trained manpower?

STEEL's guideposts will tell you how much to contribute to the colleges; where the money should be spent; and how to administer the spending.

What can you expect to get in return? STEEL will tell you of the immediate and direct benefits, as well as the long range, indirect results.

Consensus: The future of America's college system may well depend on how fast industry picks up the ball.

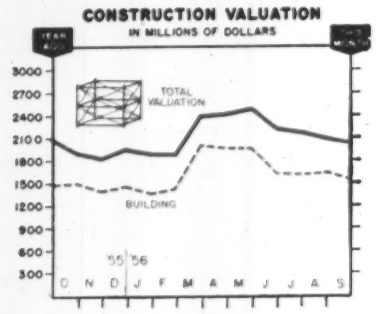
THE BUSINESS TREND



(Seasonally adjusted)

	Total Production		Primary Metals		Metal Fabricating	
	1956	1955	1956	1955	1956	1955
Jan.	143	132	148	127	170	157
Feb.	143	133	148	131	168	157
Mar.	141	135	145	136	166	160
Apr.	143	136	145	138	171	160
May	141	138	141	140	167	163
June	141	139	135	143	168	164
July	136	139	68	134	169	166
Aug.	142	140	124	139	173	168
Sept.	144*	142	151*	146	174*	171
Oct.	...	143	...	148	...	173
Nov.	...	143	...	149	...	172
Dec.	...	144	...	151	...	172
Avg.	...	138	...	140	...	165

Federal Reserve Board. *Preliminary.
Charts copyright, 1956, STEEL.



	Total		Building	
	1956	1955	1956	1955
Jan.	1,858.2	1,504.5	1,355.7	1,255.1
Feb.	1,859.7	1,581.1	1,429.3	1,278.6
Mar.	2,382.0	2,134.8	1,986.5	1,748.6
Apr.	2,421.5	2,322.1	1,965.6	1,776.1
May	2,479.8	2,185.1	1,948.7	1,737.1
June	2,197.8	2,255.2	1,620.5	1,793.7
July	2,148.6	2,271.5	1,605.3	1,851.6
Aug.	2,068.8	1,894.8	1,621.0	1,516.9
Sept.	2,024.8	2,034.9	1,539.7	1,442.2
Oct.	.....	1,862.7	.....	1,474.8
Nov.	.....	1,796.8	.....	1,388.3
Dec.	.....	1,920.8	.....	1,438.0
Totals	.....	23,764.3	.....	18,701.0

F. W. Dodge Corp.

tion of components for autos will push metal fabricating plants to new efforts. This will call for more nonferrous metals, as well as more steel (see page 184). Industrial use of electricity will advance with this increased industrial activity at a time when shorter daylight hours will hike nonindustrial use. Loadings of revenue freight, which are holding at a high level because of heavy iron ore and coal loadings, will edge a little higher before winter sets in.

The above gives some indication of what will happen to the Federal Reserve Board's industrial production index during the fourth quarter. In September, it equaled the all-time high of 144 (1947-1949 = 100) set last December (see chart, above). It now seems clear that the fourth quarter monthly average will be well above the 145 widely predicted.

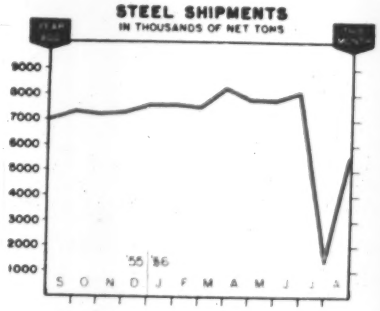
Construction Eyes Record

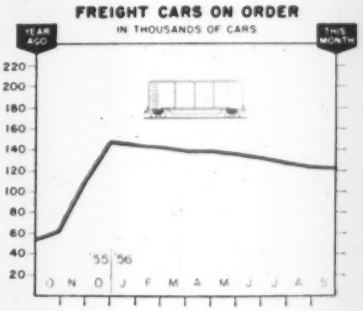
Construction is heading into the fourth quarter comfortably ahead of the record pace set last year. F. W. Dodge Corp. says the nine-month gain for all types of building is 7 per cent, compared with the mark of the corresponding period of 1955. September awards for future construction in the 37 eastern states (see chart, above) dipped below the year-ago month by a fraction of a percentage point. This was the third month this year to fall below the year-ago month's total—June and July being the other two. It is too early to call this a trend, because seasonal factors play an important part in construction now. There is no doubt that a record outlay of $44.5 billion will be reached this year.

One thing that assures a new dollar mark (1955 total was $43 billion) is the rising cost of building. Aberthaw Construction Co. reports its cost index for industrial building advanced from 420.7 (1915 = 100) on July 1 to 441.3 on Oct. 1, a rise of almost 5 per cent. But most building experts agree that a considerable portion of the record will be accounted for by a greater amount of new construction.

Steel Shipments Slump

Just how much of a bite the steel strike took out of shipments of finished steel is clear from the chart on page 99. During July





	Net Tons		
	1956	1955	1954
Jan.	7,587,870	6,009,958	5,727,600
Feb.	7,468,393	6,119,900	5,364,978
Mar.	8,255,824	7,268,795	5,583,690
Apr.	7,783,873	7,279,321	5,287,972
May	7,764,776	7,540,889	5,423,168
June	8,077,805	7,770,213	5,887,488
July	1,288,988	6,250,597	4,490,179
Aug.	5,539,915	7,053,615	4,681,242
Sept.	.....	7,378,247	5,004,222
Oct.	.....	7,216,821	5,035,384
Nov.	.....	7,247,994	5,240,209
Dec.	.....	7,580,943	5,448,649

American Iron & Steel Institute.

	Awards		Backlog (end of month)	
	1956	1955	1956	1955
Jan.	1,818	5,087	144,946	18,395
Feb.	1,675	2,690	141,437	18,633
Mar.	1,618	2,156	137,070	17,974
Apr.	6,559	2,706	137,436	17,930
May	2,403	3,041	133,072	16,886
June	2,859	13,365	129,409	27,102
July	2,642	18,007	126,194	42,888
Aug.	2,575	13,405	122,870	52,803
Sept.	3,949	3,228	122,421	52,913
Oct.	....	12,843	.....	61,954
Nov.	....	51,066	.....	109,370
Dec.	....	42,278	.....	147,320
Total	....	169,872		

American Railway Car Institute

and August, shipments totaled only 6,828,903 net tons. You have to go as far back as July, 1955, when a token strike interrupted production to find a mark that low for a single month. September shipments still will show some effects of the strike, but in October they'll hit around 8.5 million tons for the first time. Steel mill operations this month make that record a certainty. If automotive demand strengthens later in the fourth quarter, that mark will last only until December.

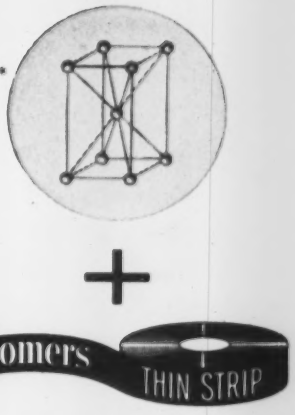
Income Gets Fatter

Full production means fuller pay envelopes with more spendable income for more people. Average weekly earnings at factories rose to a new high of $81 as average hourly earnings went up to $2 in September, according to government reports. October will be even better in this respect, with the auto companies recalling workers laid off in the last six months and adding overtime.

Income has been going up all year and has had an effect on several important business indicators. Department store sales have climbed steadily, registering a gain of 4 per cent over those of the same period last year. Workers have been more active in savings than in several years, putting away $7 billion during first half, according to the Securities & Exchange Commission. Last year, they put away $1.4 billion in first half and only $8.2 billion for the whole year.

Market Memos

- Both business incorporations and failures declined about 15 per cent during September, reports Dun & Bradstreet Inc. For the first nine months, the score stands: Incorporations, 108,692; failures, 9547.
- The Association of American Railroads reports that freight car deliveries fell off to 3444 in September because of the lack of steel. "Things were tight before the steel strike," says an association spokesman, "and it's even worse now." Backlog also declined (see chart above.) The association also reported that Class I railroads installed 1125 new locomotive units during the first nine months of 1956, compared with 786 units during the corresponding period of 1955.



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Somers engineers have developed a special hot tin plate process which now will provide the smooth surface, solderability, adherence and complete absence of slag so essential to manufacturers of:

PRINTED CIRCUITS
CAPACITORS
CABLE WRAPPING

Tin coatings of .00002 to .00008 and .0002 to .0003 are available on brass, copper, bronze and other Thin Strip metals in gauges from .012 down to .002, widths from ⅛" to 6" and wider.

And, of course, Somers exacting standards for tolerance, tensile strength and other physical properties are rigidly maintained.

Whatever your requirements for tin plated thin strip, you can depend on Somers long experience and modern equipment for a quality product.

Write for further information and confidential data blank. Somers will gladly analyze your problem without obligation.

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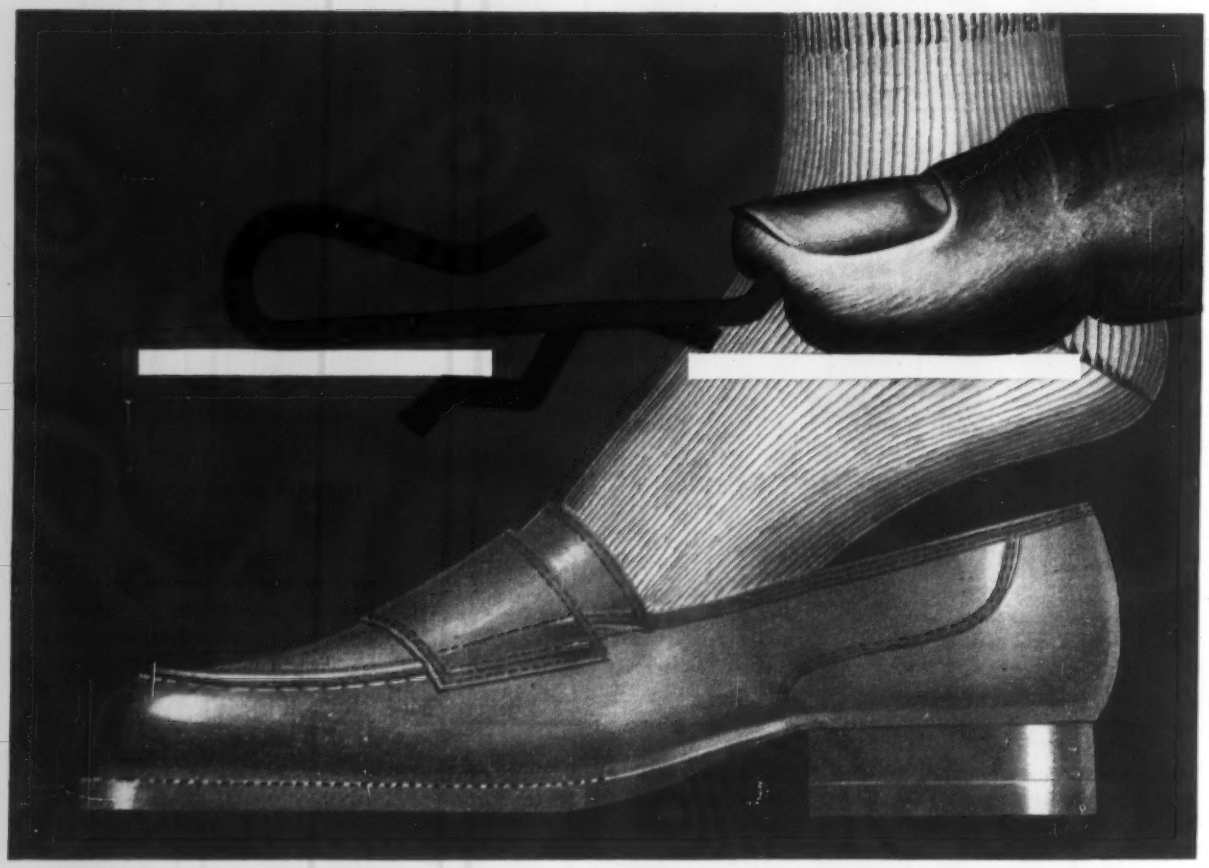


MONEY-SAVING MAGIC IN THIS "HEEL AND TOE"

This Tinnerman fastener is modeled after your foot . . . there's a heel and toe . . . it slides easily into the holes punched in the metal, fiber, or plastic, even as your foot slides into a shoe. But it is much easier to put on than to take off!

The primary function of this SPEED NUT fastening principle is to provide a fast, easy-to-apply, low-cost, self-retaining fastener. Its snap-on attachment feature requires little skill and no welding or staking. Yet it assures positive retention for center panel or blind locations.

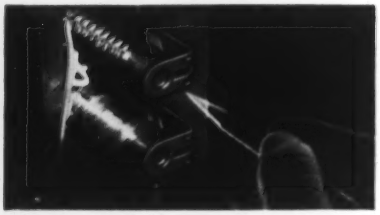
Tinnerman "heel-and-toe" fasteners can also have a wide variety of fastening features. The self-retaining heel-and-toe can be combined with the famous Tinnerman SPEED NUT impression. Or with a speedy cable clip . . . or a spring catch . . . a molding clip . . . a wire retainer . . . almost any fastening idea you require.

Tinnerman sales engineers are ready to make a SPEED NUT Analysis of your fastening requirements. Or you can write to us for details and engineering data. *Tinnerman Products, Inc., Box 6688, Dept. 12, Cleveland 1, Ohio.*

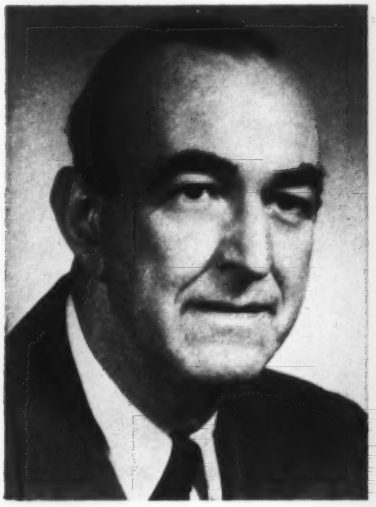
TINNERMAN
Speed Nuts®
FASTEST THING IN FASTENINGS®

On dictating equipment, this SPEED CLIP® holds wires safely away from moving parts.

SPEED CLIPS secure molding on plastic sign, help manufacturer gain 48% assembly saving.



Assembly of TV tuning coil to chassis and servicing simplified with special SPEED CLIP.



DR. JAMES C. HODGE
. . . executive v. p. at Warner & Swasey

Dr. James C. Hodge, vice president, was elected executive vice president of **Warner & Swasey Co.,** Cleveland. Formerly president of Wellman Engineering Co., he joined W&S in January.

Vernon L. Strohm was appointed general superintendent, Waukegan, Ill., Works, **American Steel & Wire Division,** U.S. Steel Corp. He was division superintendent of the wire mill. **Frank E. Kyndberg** succeeds his brother, the late **Elmer Kyndberg,** as general sales manager, Cyclone Fence Department, Waukegan.

A. H. Wardwell was appointed assistant to the vice president, **American Steel & Wire Division,** U.S. Steel Corp., Cleveland. He is succeeded as director of raw materials by **Jacob W. Cox,** former assistant to general superintendent, Donora, Pa., plant.

Carl F. Pabst was elected vice president - engineering, **Lodge & Shipley Co.,** Cincinnati. **Claus L. Sporck** was named vice president, Floturn Division.

William J. During Sr. resigned as president and **W. J. During Jr.** as secretary of **Precision Castings,** Syracuse, N. Y. **John J. Punke** was appointed executive vice president in charge of the Syracuse operations, now conducted as a division of Harsco Corp.

G. A. GILBERTSON
. . . heads Frank G. Hough Co.

G. A. Gilbertson, former executive vice president-general manager, was elected president and chief operating officer of **Frank G. Hough Co.,** Libertyville, Ill., a subsidiary of International Harvester Co. He succeeds **Frank G. Hough,** founder and president, who was elected to the new office of chairman.

Stanley J. Roush fills the new post of group vice president, **Borg-Warner Corp.,** Chicago. He retains his positions of president, Atkins Saw Division, Indianapolis; and president, Morse Chain Co., Ithaca, N. Y. subsidiary.

Walter R. Bush was elected vice president-engineering and a member of the management committee of **Fenwal Inc.,** Ashland, Mass. He was chief components development engineer for Republic Aviation Corp.

John J. Burke was elected vice president - engineering, **Hallamore Electronics Co.,** Anaheim, Calif., division of Siegler Corp. He was head of the guidance and electronics division of the U.S. Jet Propulsion Laboratory.

United States Steel Corp., Pittsburgh, appointed **Max H. Hofmann** manager of sales, Washington district; **Loring S. Brock** to succeed Mr. Hofmann as assistant manager, structural and plate steel sales division.

D. D. McKILLOP
. . . Coolidge Corp. v. p.-operations

D. D. McKillop fills the new post of vice president-operations, **Coolidge Corp.,** Middletown, O. He was works manager. **John R. Garwood** was elected secretary-treasurer.

Richard G. Lyall, chief engineer, was elected vice president-engineering, **Adsco Industries Inc.,** Buffalo.

William G. O'Callaghan was made general superintendent of production at Aeroproducts operations, **Allison Division,** General Motors Corp., Dayton, O. He is succeeded as superintendent of propeller blade production by **Jack O. Young.**

Ralph S. White was made manager of research and engineering for Spinco Division, **Beckman Instruments Inc.,** Belmont, Calif. He transfers from Stamford, Conn., where he served as assistant manager, Liston-Becker plant.

Cecil R. Russell was made vice president, **J. B. Rea Co. Inc.,** Santa Monica, Calif. He will head engineering and production.

John A. Vaughan was appointed engineering manager, Watertown, N. Y., division, **New York Air Brake Co.** He succeeds **Karl Galliger,** recently named director of engineering for the company.

Albert N. Whitlock was made

STEWART H. KILMER
. . . works mgr. of Spang-Chalfant plant

ROBERT A. BECK
. . . vice president of City Tool Corp.

WILLIAM H. MANN
. . . Skinner Electric Valve sales mgr.

manager of the Aurora, Ill., plant of **Caterpillar Tractor Co.**

Stewart H. Kilmer, general superintendent since 1949 of the Ambridge, Pa., plant, **Spang-Chalfant Division**, National Supply Co., was made works manager to succeed **Ernest G. Unrath**, recently named vice president-manufacturing. **Myron J. Demeter** was promoted to assistant works manager; **George H. Shiveley** to general superintendent; **Herbert T. Buchholz** to plant controller.

Baboo R. Teree was appointed chief engineer, **Greer Hydraulics Inc.**, Jamaica, N. Y. He was with Weatherhead Co. as chief engineer, aircraft division and special products division. **Robert E. Williams** was made operational manager of Greer Industries Inc., subsidiary.

Howard G. Williams was elected vice president-manufacturing, **Fedders-Quigan Corp.** He has headquarters at Maspeth, L. I.

William J. White was made plant manager at **Carver Foundry**, Fairview Village, Pa.

J. F. Costigan was made assistant director, Industries Group, **Allis-Chalmers Mfg. Co.** He was works manager, Norwood, O., Works.

Charles H. Shelton was made chief metallurgist, **White Motor Co.**, Cleveland. He was chief metallurgist for Tyson Bearing Corp., a subsidiary of SKF Industries Inc.

Robert A. Beck was elected vice president, **City Tool Corp.**, Dayton, O. He is also plant superintendent.

American Hoist & Derrick Co., St. Paul, appointed **Hillard M. Patton** manager of its new foundry division in charge of castings purchased or made by the firm for use in the St. Paul plant as well as in all divisions. **Harry A. Anderson** was made manager of general manufacturing in the St. Paul plant; **Ernest S. Egertson** was made chief industrial engineer. **Walter R. Olson** was made production control manager of the St. Paul and Ft. Wayne, Ind., plants.

William H. Mann was promoted to sales manager, **Skinner Electric Valve Division**, Skinner Chuck Co., New Britain, Conn. He was assistant to the sales manager.

George H. Parker was appointed manager of the steel-fabricating plant being constructed at Chicago Heights, Ill., by **Luria Engineering Co.** He was sales service manager at the Bethlehem, Pa., plant.

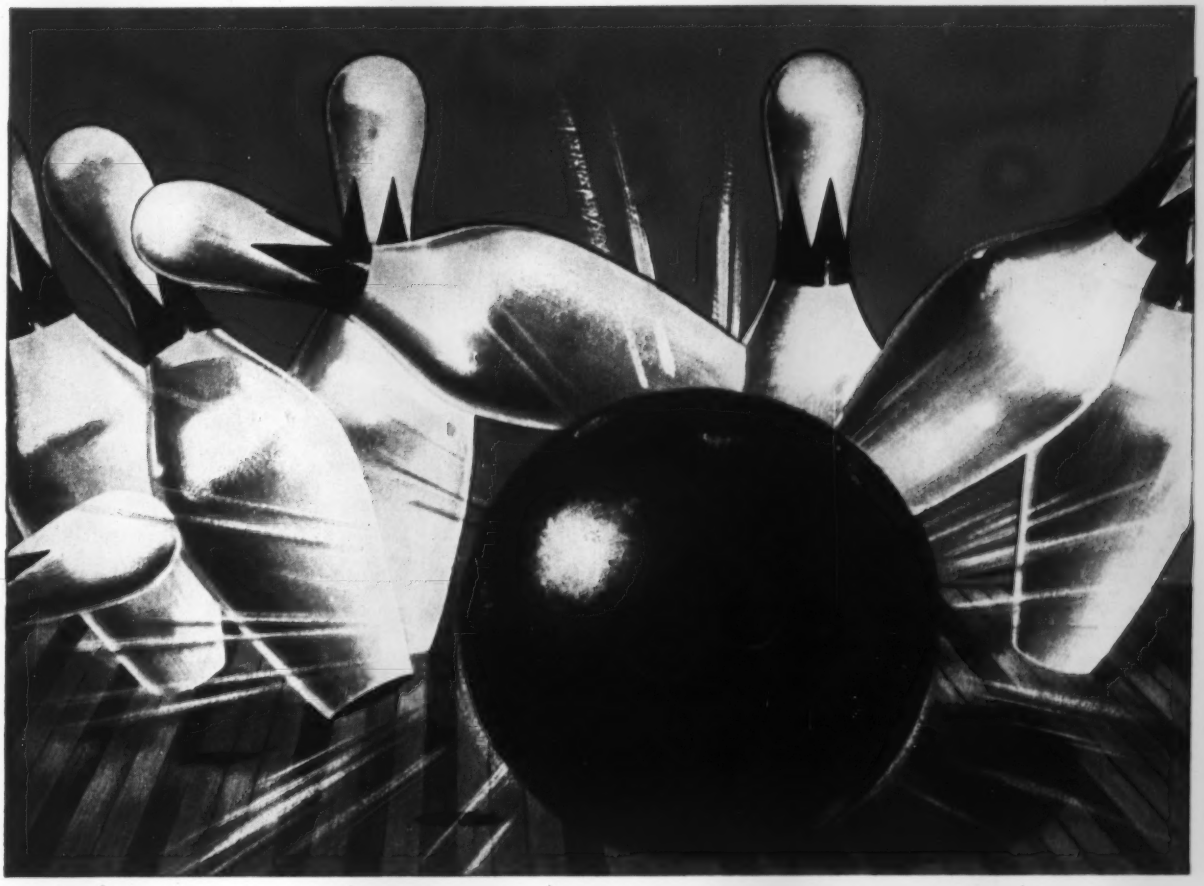
Vice Adm. Richard F. Whitehead (ret.) was elected vice president, **American Gage & Machine Co.**, Chicago.

Dr. B. M. Wolffframm was elected

HILLARD M. PATTON

HARRY A. ANDERSON

. . . appointments in American Hoist & Derrick mfg. div.



"Finish first in your league"
...with J&L 1200 COLD FINISHED STEELS

When your machining applications require a steel that's tops in quality, machinability, uniformity and surface finish—"J&L 1200" Cold Finished Steel is the answer. It's one of a complete line of premium quality, free-machining bar steels developed over the years by J&L specialists. Thus, we can recommend the right type to help solve your problems.

Operators in shop after shop around the country using "J&L 1200" report:

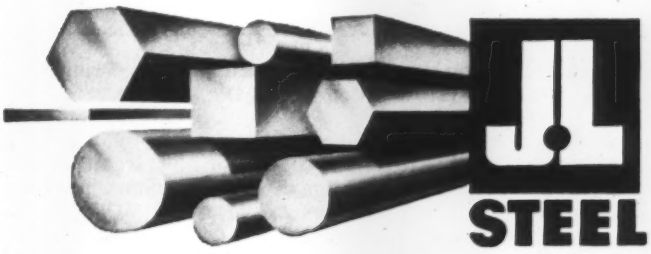
- Better machine finishes
- Improved tool life
- Increased machining speeds
- Greater uniformity

"J&L 1200" grades, available in all standard shapes and sizes, meet the compositions published by the American Iron & Steel Institute (AISI C-1213) . . . Society of Automotive Engineers (SAE 1113) . . . and Federal Specification QQS-633.

Use this steel in your own shop to secure better work at lower over-all costs. Results will convince you "J&L 1200" deserves to be a regular specification for your production runs.

Adequate stocks of all J&L cold finished free-machining steels are available in important industrial centers. Phone the nearest J&L District Office or your Distributor today for prompt and efficient service.

Pick the Free-Machining Steel that serves you best—from J&L's complete Cold Finished Line



Jones & Laughlin
STEEL CORPORATION · PITTSBURGH

COLD FINISHING PLANTS AT
PITTSBURGH, PA., AND HAMMOND, IND.

JOHN BREITER
. . . Eastern Rolling Mills purchasing dir.

HAROLD W. COTTRELL
. . . Cincinnati Milling Products sales mgr.

JOHN G. SCHAEFFER
. . . mfg. manager at General Metals foundry

a vice president of **Magnetic Research Corp.**, El Segundo, Calif.

John Breiter was made director of purchases, **Eastern Rolling Mills Inc.**, New York. He was in the sales department, covering the New Jersey and Connecticut areas.

Austin S. Joy joined the sales staff, tube and steel division, **Brumley-Donaldson Co.**, Los Angeles. He was sales manager of Bechtel Corp.'s Semastic Division.

Harold C. Wagner was appointed technical director; **Thorald C. Alexander**, chief engineer of **Zirconium Corp. of America**, Solon, O.

D. A. Hanan was made eastern district manager, **Peterson Steels Inc.**, with headquarters in Union, N. J. He is replaced as Detroit district manager by **L. A. Wheeler.**

H. A. Davidson was made plant engineer in charge of maintenance of plant equipment and new construction for **Wettlaufer Engineering Corp.**, Detroit. He is succeeded as purchasing agent by **H. H. Penny.**

Harold W. Cottrell was made sales manager, **Cincinnati Milling Products Division**, Cincinnati Milling & Grinding Machines Inc., Cincinnati. He succeeds **Philip O. Geier Jr.** who fills a new post of assistant manager.

John R. Roberts was made general superintendent and **Anthony J. Jasinski** assistant general superintendent of the Milwaukee plant, tubular products division, **Babcock & Wilcox Co.**

John E. Sandberg was made sales manager, **Enamel Products & Plating Co.**, McKeesport, Pa. He held a similar post with Shenango Steel Co.

William J. Cahill was named manager of production control, **Electronics Inc.**, Mayfield, Pa. He was production control manager in the Gyro department of W. L. Maxson Corp.

H. M. Harper Jr., pricing manager, was made assistant to the president of **H. M. Harper Co.**, Morton Grove, Ill., to handle special assignments.

John G. Schaeffer was made manufacturing manager of the Oakland, Calif., foundry of **General Metals Corp.** He was foundry superintendent of the Vernon, Calif., plant.

Prieth F. Benedict was elected president of **Benedict-Miller Inc.**, Lyndhurst, N. J. He succeeds **Purdy F. Benedict**, now chairman. **Harvey L. Miller** was elected vice chairman.

Melville S. Miller was named sales manager, coupling division, **On Mark Engineering Co.**, Glendale, Calif.

L. W. Long and **J. H. Burrus Jr.** were made assistant general managers, power equipment division, **Allis-Chalmers Mfg. Co.** Mr. Long is succeeded as general manager, Terre Haute, Ind., Works by **A. I. Thorsen.**

Howell Electric Motors Co., Howell, Mich., named **T. A. Armstrong** assistant sales manager; **H. D. Lewis**, manager of industrial sales; **Francis L. Sherman**, manager of Gearmotor sales.

OBITUARIES . . .

Philip B. Mansfield, 57, chief electrical engineer at **Republic Steel Corp.'s** Buffalo plant, died Oct. 10.

Mark E. Morgenstern, 62, New York district manager of sales, **Detroit Steel Corp.**, died Oct. 13.

Elmer Elliott, 68, partner in **Elliott Bros. Steel Co.**, Newcastle, Pa., died Oct. 21.

N. M. Marsilius, 66, chairman, **Producto Machine Co.**, Bridgeport, Conn., died Oct. 17.

R. A. Glass Sr., 59, New England regional sales manager, **Whitney Chain Co.**, Hartford, Conn., died Oct. 10.

What are your refractory castable problems ?

- High Temperatures?
- Abrasion and Erosion?
- Slag Attack?
- Overhead Applications?
- Insulating Properties Required?

B&W makes a wide range of specialized refractory castables. Whatever your problem, you will find helpful data in B&W Bulletin R-35. Send for your copy today.

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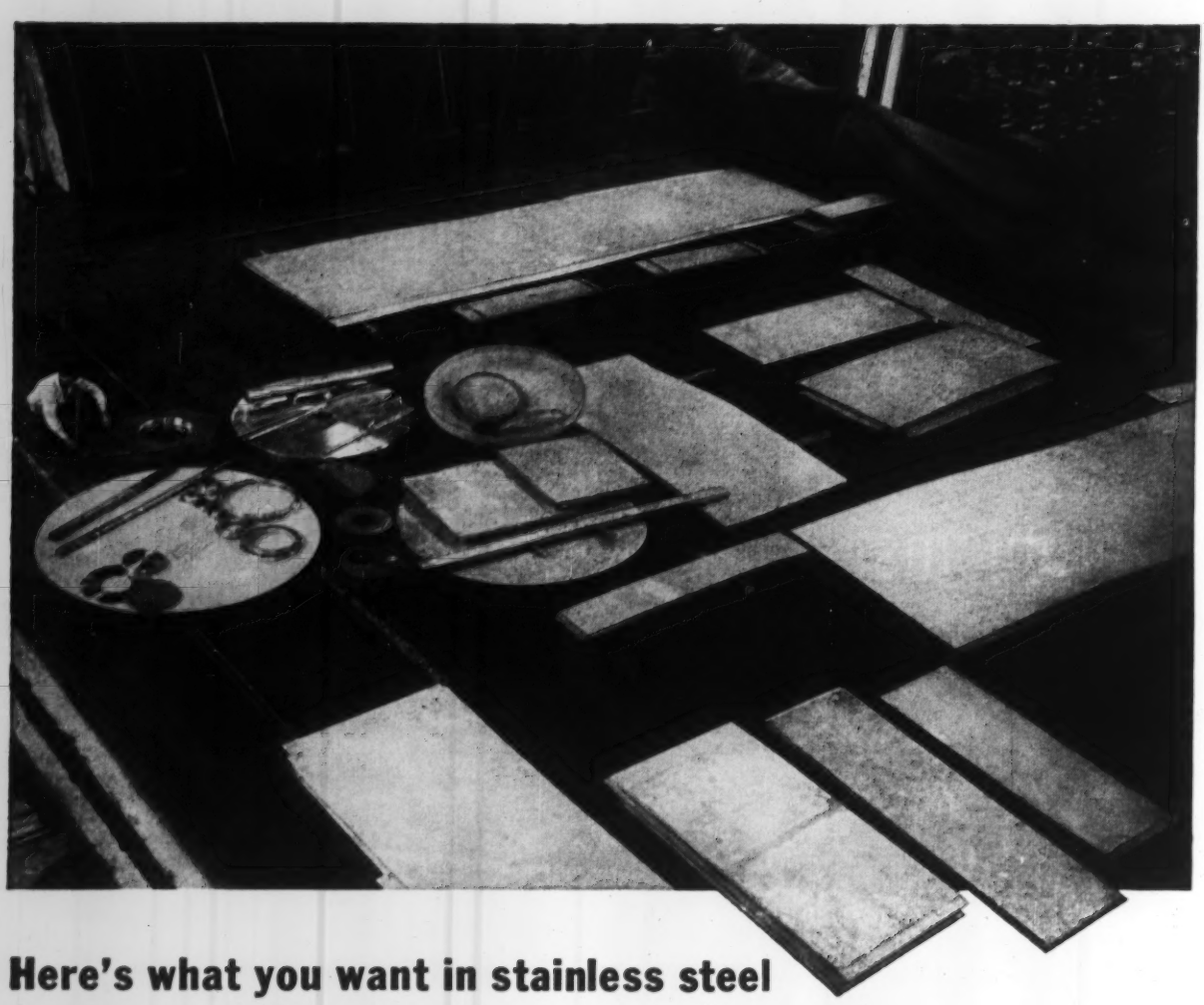
THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.



Here's what you want in stainless steel —the way you want it

Stainless Steel Plate . . . produced to almost any size or thickness, ⅛" and heavier, in rectangles or cut-to-shape. Carlson maintains what is probably the largest stock of stainless plate in the country—produced to highest chemical and metallurgical standards—ready for cutting to your requirements, and for shipment when you want it.

Stainless Steel Heads . . . spun or press formed to your order or taken directly from our stock of ASME and Standard flanged and dished heads—the *largest stock* maintained anywhere. In addition to supplying heads for tanks, heat exchangers, condensers and similar equipment, Carlson can fill a complete bill of material including shell plates, flanges, rings, pads and other components.

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Complete Service . . . At Carlson the emphasis is on flexibility, efficiency and economy in producing what you want, when you want it. If you would like additional information about our service and products or, if you want *to place an order*—just let us know, we promise you prompt action!

write for CARLSON'S WEEKLY STOCK LISTS . . . YOUR GUIDE TO WHAT'S AVAILABLE IN QUALITY STAINLESS STEEL

Stainless Steels Exclusively

G. O. CARLSON, INC.

THORNDALE, PENNSYLVANIA

Plates • Plate Products • Forgings • Bars • Sheets (No. 1 Finish)

District Sales Offices in Principal Cities

More Conduit Tubing

Capacity of Republic's Ferndale, Mich., plant will be raised to meet growing demand

ADDITIONAL facilities for the manufacture of conduit will be built by Republic Steel Corp., placing the firm in "excellent shape" to grow with the expanding electrical industry.

A major expansion of Republic's Steel & Tubes Division plant at 965 Wanda Ave., Ferndale, Mich., will provide space and equipment for the production of Electrunite light—wall conduit tubing. The over-all program may cost some $3 million, says T. F. Patton, president.

Expansion Plan—One new building will be erected. Shipping facilities will be enlarged. New equipment to be installed will include high-speed welding machines, finishing and electrogalvanizing equipment.

Electrogalvanizing facilities will consist of completely integrated equipment for degreasing, pickling, electrogalvanizing, washing, inch marking, enameling, labeling, inspection and bundling. All operations will be arranged for straight line production.

G. E. Ingraham is superintendent of the Ferndale plant. The division also operates plants in Cleveland, Elyria, O., and Brooklyn, N. Y.

Michigan Industries Formed

Consolidated Foundries & Mfg. Corp., Chicago, organized a wholly owned subsidiary, Michigan Industries Co., Detroit. Frank Kiper, vice president of Consolidated, was elected president of the new firm. He has direct responsibility for its five divisions. Four are in Detroit: Michigan-Standard Alloy Casting Co. (heat and corrosion-resistant, high-alloy castings); Misco Fabricators (contract fabricators of heat and corrosion-resistant steel products); M.S. Machine Products Co. (contract machiners of heat and corrosion - resistant steels; maker of glass rolls, furnace rolls, furnace conveyor chains and belts); and WaiMet Alloys Co. (producer of metallurgical products, including master remelt alloys for the investment casting industry). Western Foundry Co. (producer of gray iron castings) is at Holland, Mich.

S. E. Mueller, formerly associated with American Steel Foundries, was named president of Michigan-Standard Alloy Casting Co. R. F. Waindle, formerly president of WaiMet Engineering Co., was named president of WaiMet Alloys Co.

M. S. Machine Products Co. will operate temporarily under the direct supervision of Mr. Kiper. C. J. Johnson will continue as president of Holland Foundry, Garth S. Thompson as president of Misco Fabricators.

Opens Branch in Georgia

American Radiator & Standard Sanitary Corp.'s Ross Heat Exchanger Division, Buffalo, opened an office at 522 N. McDonough St., Decatur, Ga. Fred M. Mahan is manager.

Thompson Builds in Virginia

Thompson Products Inc., Cleveland, is building a $10 - million facility for its Accessories Division at Roanoke, Va. This engineering and development center will test fuel systems and auxiliary power systems for rockets and missiles. Construction work is scheduled over a five-year period.

Fluor Corp. Gets Big Contract

Fluor Corp. of Canada Ltd., subsidiary of Fluor Corp. Ltd., Los Angeles engineering and construction firm, has been awarded a contract to construct a detergent alkylate plant for Imperial Oil Ltd. at Sarnia, Ont. Completion of the $3.8-million project is scheduled for next summer.

Widens Aluminum Product Line

Kawneer Co., Niles, Mich., added decorative parts to its line of aluminum products. The work will be centered at Cynthiana, Ky., where the company's Appliance Products Division has two plants which make aluminum wire shelves and fabricated anodized parts for refrigerators and other major appliances.

41,000 Miles of Wire

You could circle the earth once and tie a big knot with the amount of wire it took to make cables for the Mackinac Straits bridge. Employees of U.S. Steel's American Bridge Division are inspecting the west main cable. It and 23 other ½-in. cables like it contains 12,580 wires each. They will be banded after a compacting mechanism squeezes them together. U. S. Steel's American Steel & Wire Division made the wire

Hoffman Iron & Steel Expands

Hoffman Iron & Steel Co. is adding 6000 sq ft to its plant to speed fabrication of gear guards and custom mill machinery.

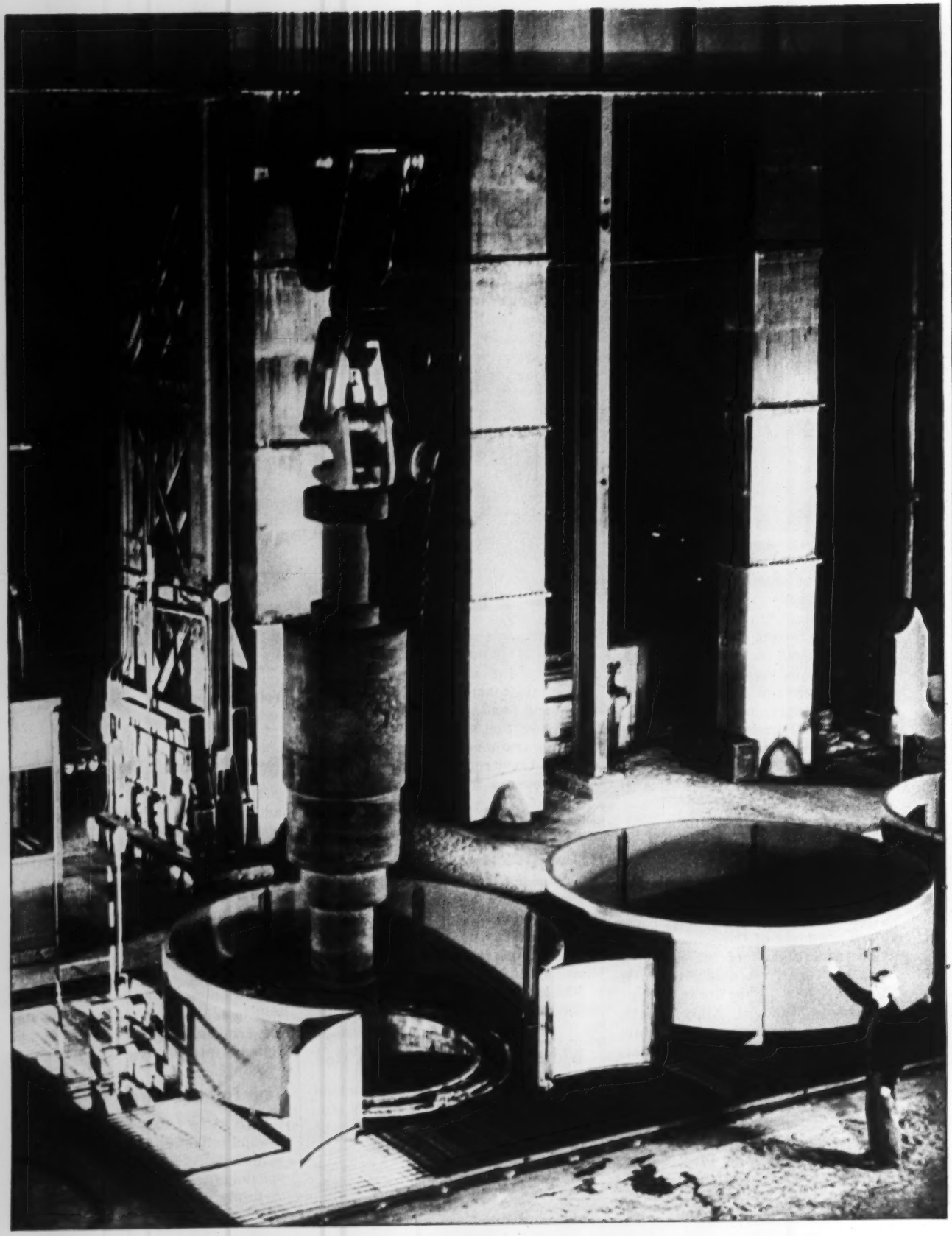
Worthington Buys Plant

Worthington Corp., Harrison, N. J., purchased a manufacturing plant in Alhambra, Calif. It will be operated as the Western Air Conditioning Division. Products will include warm air furnaces and air handling equipment for year-round air conditioning systems.

Tipp Forms Controls Division

Tipp Mfg. Co., Tipp City, O., established a Controls Division to manufacture a diversified line of "package" industrial controls for virtually any function that can be

(*Please turn to page* 110)



Giants, too, heated without distortion

Westinghouse pressurized furnaces keep 30-ft forgings "straight as an arrow" at U. S. Steel

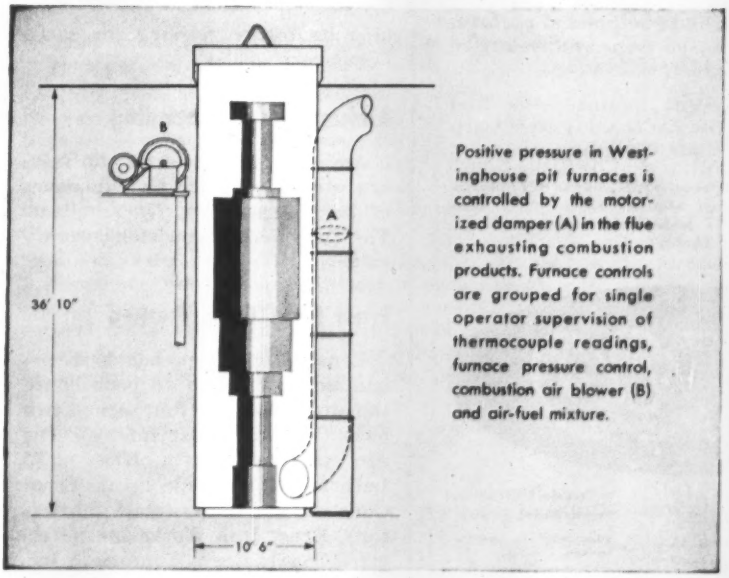
Three large, Westinghouse pit-type furnaces at U. S. Steel's Homestead Works are built to pamper giant forgings. This turbine rotor, for example, lifts out straight and true at 1830°F. During eight hours of soaking heat the temperature along its 30-foot length never varied as much as 10°F. Distortion was never a problem because of Westinghouse temperature control and positive pressure furnace design.

In this design even heating is assured through back pressure control of combustion gases. With positive pressure in the furnace any air leakage is always outward. Thus localized chilling of the work is prevented. The furnace is tangentially fired by means of spirally located burners and is equipped with 3 zones of automatic temperature control. Since the products of combustion are sucked out from the bottom of the furnace, heat currents make two passes the full length of the work...once upward, once downward.

In Westinghouse experience with gas, electric, or induction heating equipment, we have undoubtedly solved a problem like yours. You can be sure of our broad experience by calling your local Westinghouse industrial heating engineer today or write Westinghouse Electric Corporation, Industrial Heating Division, Meadville, Pa. J-10451

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***



Positive pressure in Westinghouse pit furnaces is controlled by the motorized damper (A) in the flue exhausting combustion products. Furnace controls are grouped for single operator supervision of thermocouple readings, furnace pressure control, combustion air blower (B) and air-fuel mixture.

W. E. Collar reports . . .*

Facts to lick your distortion problem

Unusual facilities and experience at Westinghouse have enabled us to jump years of trial-and-error methods in engineering furnaces and induction heating equipment to prevent distortion. We're constantly after better ways to gain temperature uniformity in metal processing equipment. This is necessary not only to prevent distortion but also to obtain desired metallurgical properties.

On special problems, our equipment design engineers have the advantage of facts gained through Westinghouse metallurgical research activities. Production testing of equipment design and engineering is carried out by our Materials Manufacturing Division at Blairsville, Penna. These activities back up our long experience in gaining accurate heat distribution for positive temperature uniformity.

The results can be seen in a Westinghouse furnace used for the air tempering of rotors for atomic equipment. Accurate heat control designed into this electrically heated furnace meets demanding requirements for distortion-free work.

Another case in point is the work on distortion problems under way in our induction heating laboratory. Here equipment is being developed for distortionless hardening of automotive axles.

The teamwork that solved these application problems is your assurance of getting the latest in engineering development and the finest equipment for all your metal processing needs.

**Manager, Industrial Heating Dept.*

The Westinghouse Heat-Treating Family

GAS • ELECTRIC • INDUCTION

BEFORE YOU SAY,
"IT CAN'T BE CAST"
...call an
ESCO engineer!

ESCO SHELLCAST carbon steel conveyor link.

ESCO SHELLCAST Valve Linkage Levers. Alloy steel **Type 317, A296- 49T CF-8M.**

ESCO SHELLCAST Heat-treating Vane tip. Alloy steel **Type 302B, A297-49T HF.**

ESCO alloy steel castings can make your designing *easier.* You get the part you want, in the alloy you need and in the shape that saves you the most fabricating, machining and finishing time—

PLUS **Metallurgical Engineering and Research.** *ESCO* maintains one of the largest and best equipped metallurgical staffs of any alloy steel foundry—

PLUS **Product Engineering and Design.** An integrated service at all levels; in the field, at the drawing board and in the foundry—

PLUS **Foundry Facilities and Casting Experience.** A casting service that covers the complete range of alloy steel casting methods for all applications—

PLUS **Laboratory Inspection and Testing.** *ESCO* laboratory technicians are qualified and equipped to perform all types of inspections and testing to the most rigid specifications.

Call an *ESCO* Engineer—let him show you how *ESCO* Alloy Steel Castings make your designing easier.

Write today for your *FREE* copy of this informative 100-page reference book—"*ESCO* Alloy and Stainless Steels for the Process and Manufacturing Industries".

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Manufacturing Plants
2160 N.W. 25th Ave., Portland 10, Oregon
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420 Lexington Ave., New York City, N.Y.
Other Offices and Warehouses
Los Angeles, San Francisco, Calif.; Seattle, Spokane, Wash.; Salt Lake City, Utah; Denver, Colo.; Houston, Texas; Centralia, Pa.; Eugene, Ore.; Honolulu, Hawaii

In Canada, ESCO Limited
Manufacturing Plants
Vancouver, B.C., and Toronto, Ontario.

(*Concluded from page* 107)

measured electrically. All field sales problems involving the new line will be handled by D. J. Dolan. Chief engineer of the Controls Division is R. A. Moenich.

Circle Wire Enters New Field

Circle Wire & Cable Corp., Maspeth, N. Y., a wholly owned subsidiary of Cerro de Pasco Corp., is expanding its operations to include the production of wire and cable with aluminum conductors. This is Circle's first venture into the field of aluminum conductors. It previously made electrical wire and cable products which used copper conductors exclusively.

IBM Plans Research Center

International Business Machines Corp., New York, will build a research center in Yorktown, N. Y. A separate group within the IBM engineering organization was created earlier this year to consolidate all fundamental research aimed at improving the company's products. The group will be guided by Dr. E. R. Piore, director of research.

Heitmann Stocking New Unit

F. W. Heitmann Co. received the first shipment of steel at its new plant and warehouse at Kress & Old Clinton road, Houston. The firm expects to move to the new location in November and is planning its formal opening for early December.

Amherst Mfg. Expanding

Amherst Mfg. Corp., Buffalo, has started the fourth expansion of its Williamsville, N. Y., plant. The firm makes precision aircraft parts.

Ernst Steel Corp. Formed

Ernst Steel Corp. has been organized at Buffalo to consolidate the operations of four companies owned by the Ernst family. The new corporation, with offices at 75 Lathrop St., is made up of Ernst Construction Corp. (steel fabricator), Ernst Iron Works Inc. (steel warehouse), Ecore Equipment Inc.

Dow . . . industry's most complete line of chlorinated solvents

DOW

"We solved a stubborn stripping problem by switching to Dow Methylene Chloride,"

says Edward J. Seitz of Lycoming

A vapor degreaser, a surfactant and Dow Methylene Chloride were the combination that Lycoming Division of Avco Manufacturing Corporation recently employed to solve a difficult stripping problem.

Edward J. Seitz, Supervisor, Special Process Engineering, put it this way: "We incurred a lot of trouble in removing the stop-off lacquer used on steel and aluminum parts, which are selectively plated. The lacquered parts had to be soaked in thinner and then periodically brushed to remove the softened lacquer. The parts then had to be rinsed in clean solvent. Another drawback was that the thinner was flammable.

"Since we switched to methylene chloride, we strip our parts in one operation. The parts are suspended in methylene chloride vapors or solvent contained in a degreaser until the lacquer is removed, and then rinsed with clean methylene chloride by means of a spray lance. This one operation takes but a few minutes, and has eliminated a fire hazard and proved a time and money saver."

Dow Methylene Chloride may be used as a vapor degreasing medium in many applications. It effectively cleans heat sensitive parts which cannot be degreased with higher boiling solvents. A *safe* solvent, methylene chloride is nonflammable and carries a low toxicity rating. It's available through the same Dow distributor who supplies Dow Perchloroethylene Industrial and Dow Trichloroethylene for vapor degreasing, and Chlorothene® for cold cleaning.

Let us send you technical information about your specific requirements. Return the coupon today to THE DOW CHEMICAL COMPANY, Midland, Mich., Dept. S-953B.

FOR PROMPTEST RETURN OF THIS INFORMATION MAIL COUPON TODAY

THE DOW CHEMICAL COMPANY, Dept. S-953B, Midland, Michigan

Send me information on

My particular interest is stripping or cleaning

NAME TITLE

COMPANY ADDRESS

CITY ZONE STATE

you can depend on DOW SOLVENTS DOW

Ask Standard

how to cut costs with conveyors

Standard gravity roller conveyors like this are modest in cost, easy to install and maintain.

Conveyor system helps Airtemp up compressor parts production 40%

To handle stepped-up demands for residential and industrial air conditioners, the Airtemp Division of the Chrysler Corporation undertook an extensive re-tooling program. On one compressor crankcase line, for example, they installed 17 new machine tools . . . connected them all with Standard gravity roller conveyors. Result — two hours saving per case, production up 40%.

If you're planning on modernizing or retooling it will pay you, too, to find out how Standard conveyors can complement new equipment . . . give you lower overall costs and greater productive efficiency. STANDARD CONVEYOR COMPANY, North St. Paul 9, Minnesota. Sales and Service in Principal cities.

To expedite shipping or stocking and reduce handling costs, investigate Standard lightweight portable roller conveyors (right) or the portable, self-powered HANDIBELT conveyor (left), which can be used horizontally or at varying incline or decline angles.

For details — contact the Standard representative listed in the classified phone book or write direct. Ask for Bulletin Y-10.

Standard 50 years of conveyor experience

GRAVITY & POWER CONVEYORS

(rental business), and Ernst-Buffalo Corp. (real estate holding firm).

Republic Replacing Furnace

Republic Steel Corp. is replacing the reheating furnace in the 14-in. bar mill at its Buffalo Works. This is part of a plant modernization and improvement program. The job will involve construction of an extension to the bar mill and installation of a new bank of soaking pits. Estimated cost $100,000.

Greenville Steel Car Expands

Greenville Steel Car Co., Greenville, Pa., is building a large addition to its plant to house the department which manufactures earthmoving equipment. The firm also plans to build a second addition.

Organizes Hermidifier Co.

Rights to manufacture and distribute Daffin humidifiers have been sold by Daffin Mfg. Co., Lancaster, Pa., and Lancaster Engineering Corp., Hazleton, Pa., to Hermidifier Co., Neffsville, Pa. Paul A. Heer is president of the newly formed Hermidifier Co.

Roebling Buys Heating Furnace

The Cold Rolled Products Division of John A. Roebling's Sons Corp., Trenton, N. J., awarded a contract to Gas Machinery Co.'s Industrial Furnace Division, Cleveland, for the installation of a continuous strip heating furnace which is 20 ft long. It has a double chamber and an alloy type muffle.

Ferguson Machine Renamed

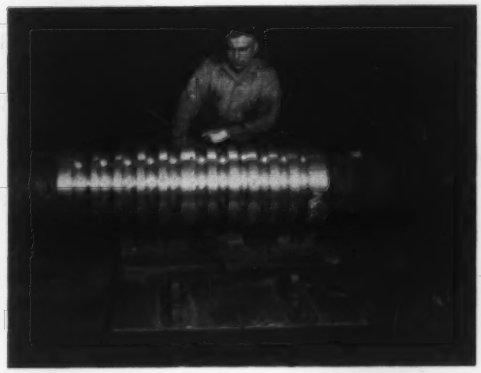
Ferguson Machine & Tool Co., St. Louis, changed its name to Ferguson Machine Corp. of Indiana. The firm, manufacturer of rotary transfer machines, acquired additional facilities in Lebanon, Ind., which will be known as the Hicks Development Division. The new property will be devoted to the building of automatic tooling for use with the company's basic transfer units. E. Gordon Reader has been appointed vice president and

TIPS FROM A ROLL MAKER'S NOTEBOOK

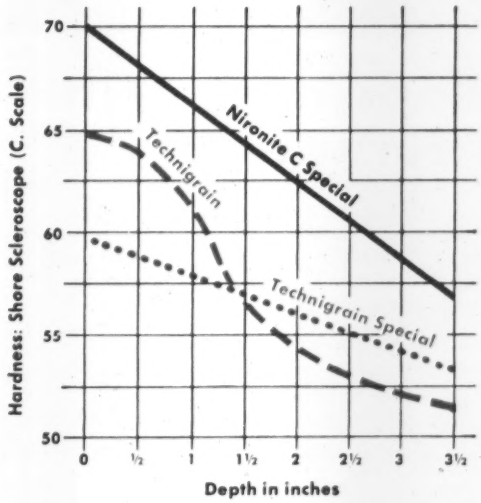
MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

A merchant mill roll should be just good enough



Easy to turn: Mack-Hemp *Technigrain* and *Technigrain Special* rolls are readily turned and redressed.



Technigrain rolls compare favorably in hardness penetration with more expensive, higher-alloy types, as shown by these generalized curves.

The wise purchaser of merchant mill rolls buys rolls that give him the service life he needs *and no more*.

This is because increased roll service life usually goes hand in hand with higher alloy content and more complex heat treatment. Both add to the price of the rolls. But... most merchant mill operators redress their rolls after each production run. Thus, if a set of rolls is still good for more tonnage before redressing at the end of a run, chances are that the rolls are too good—and therefore too expensive—for the job.

But price is not the only consideration. To be just "right", a merchant mill roll should (1) offer wearing qualities closely related to the length of the production runs for which it is used; (2) have good hardness penetration to provide wear resistance at the bottom of passes; and (3) have grain structure fine enough to assure good finish of the rolled product.

Quality at low price. Mack-Hemp *Technigrain* and *Technigrain* Special rolls offer an inexpensive solution. In fact, *Technigrain* rolls are so generally useful for all merchant shapes that they have virtually eliminated the roll inventory problem for many operators. At a price that averages several cents per pound less than higher-alloy grain rolls, *Technigrain* and *Technigrain Special* provide service life adequate for the vast majority of applications. Available in a hardness range of 55 to 60 Shore (C Scale), they offer good hardness penetration and finely dispersed graphite to provide a smooth work surface. Of course, for unusually severe merchant mill service, Mack-Hemp's *Nironite C Special* offers all of Technigrain's properties, in a higher hardness range.

To sum up, *Technigrain* is the ideal roll for general merchant mill use: it is low in cost, it provides sufficient service between redressings, and it rolls products of better-than-adequate surface finish.

Technigrain is only one of the more than thirty types and hundreds of iron and steel roll analyses produced by Mack-Hemp. For advice and information relating to your specific roll application, why not 'phone or write us today? There's no obligation. Address Mackintosh-Hemphill Division, E. W. Bliss Co., Pittsburgh 3, Pa.

MACKINTOSH-HEMPHILL

You get more tonnage from the rolls with the Striped Red Wabblers

Division of E. W. BLISS COMPANY

Presses, Rolling Mills, Special Machinery

New trends in the use of refractories

LACLEDE-CHRISTY develops new arch for metallurgical furnaces

This new furnace arch design saves installation time, saves money and features adaptability never before achieved with refractory arch construction.

The Laclede interchangeable type arch proved its money and time-saving value by more than one year heavy duty steel mill service. Service records show from 850 to 1000-heat campaigns. It is particularly suited for fantail and chill arches in open hearth furnaces, and heating zone arches in reheating furnaces as well as copper reverberatory furnace arches.

Basic tile or clay tile may be hung interchangeably on the supporting structure, as service experience requires. The design permits adequate expansion of tile during heating up and continued furnace service.

Minimum number of tile shapes are required.

Lug castings engage the tile on the bed joints, allowing easy installation. Heavy shelf castings prevent cumulative overload.

Money-saving performance can be expected when this interchangeable type arch is built with Laclede's Peerlac refractory (60% alumina) in 12 in. and 15 in. depths, and with basic refractory steel encased. Supporting structure of steel weldments and small heat-resisting castings are also available for prompt shipment.

This example of Laclede advancements in refractory service demonstrates one more point: it pays to make Laclede-Christy your first refractory source.

LACLEDE-CHRISTY COMPANY DIVISION

LACLEDE-CHRISTY COMPANY — Quality First — FOUNDED 1844

HKP — H. K. PORTER COMPANY, INC.

H. K. PORTER COMPANY, INC.
2000 Hampton Ave. · St. Louis 10, Missouri
Mission 7-2400

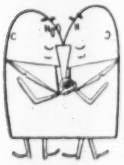
general manager of the corporation. S. K. Georgieff is engineering and sales manager of the Roller Gear Division. J. F. Miller will manage the new tooling design service.

Verson Enlarges Offices

Verson Allsteel Press Co. formally opened new offices at its 93rd street and Kenwood location in Chicago. Donald Weiss has been appointed district sales manager at Hamilton, O.

Borg-Warner Licenses Firm

Borg-Warner International Corp., foreign operations subsidiary of Borg-Warner Corp., Chicago, has licensed the manufacture of Borg-Warner automotive overdrives by Adlerwerke, automotive parts manufacturer, Frankfurt, Germany.



CONSOLIDATIONS

National Union Electric Corp., Hatboro, Pa., purchased **Armstrong Furnace Co.**, Columbus, O. W. J. Olsen was elected vice president of National Union and general manager of the firm's new division, Armstrong Furnace Co.

Rockwell Mfg. Co., Pittsburgh, purchased **Dual Parking Meter Co.**, a subsidiary of Union Metal Mfg. Co., Canton, O., and "certain assets" of three other Union Metal subsidiaries in the parking meter business.

Thomas Hydraulic Speed Controls Inc., Wichita, Kans., acquired **Aircraft & Automotive Products Inc.**, that city. All operations will be consolidated in its new West street plant. The firms will operate as separate entities. Principal product of Thomas Hydraulic is a controllable hydraulic coupling used as an engaging clutch for self-propelled machinery. Aircraft & Automotive Products makes precision piston pins and other automotive parts and does subcontract work for the aircraft industry.

Chain Belt Co., Milwaukee, acquired **General Road Machines Inc.**, Niles, O. General Road makes

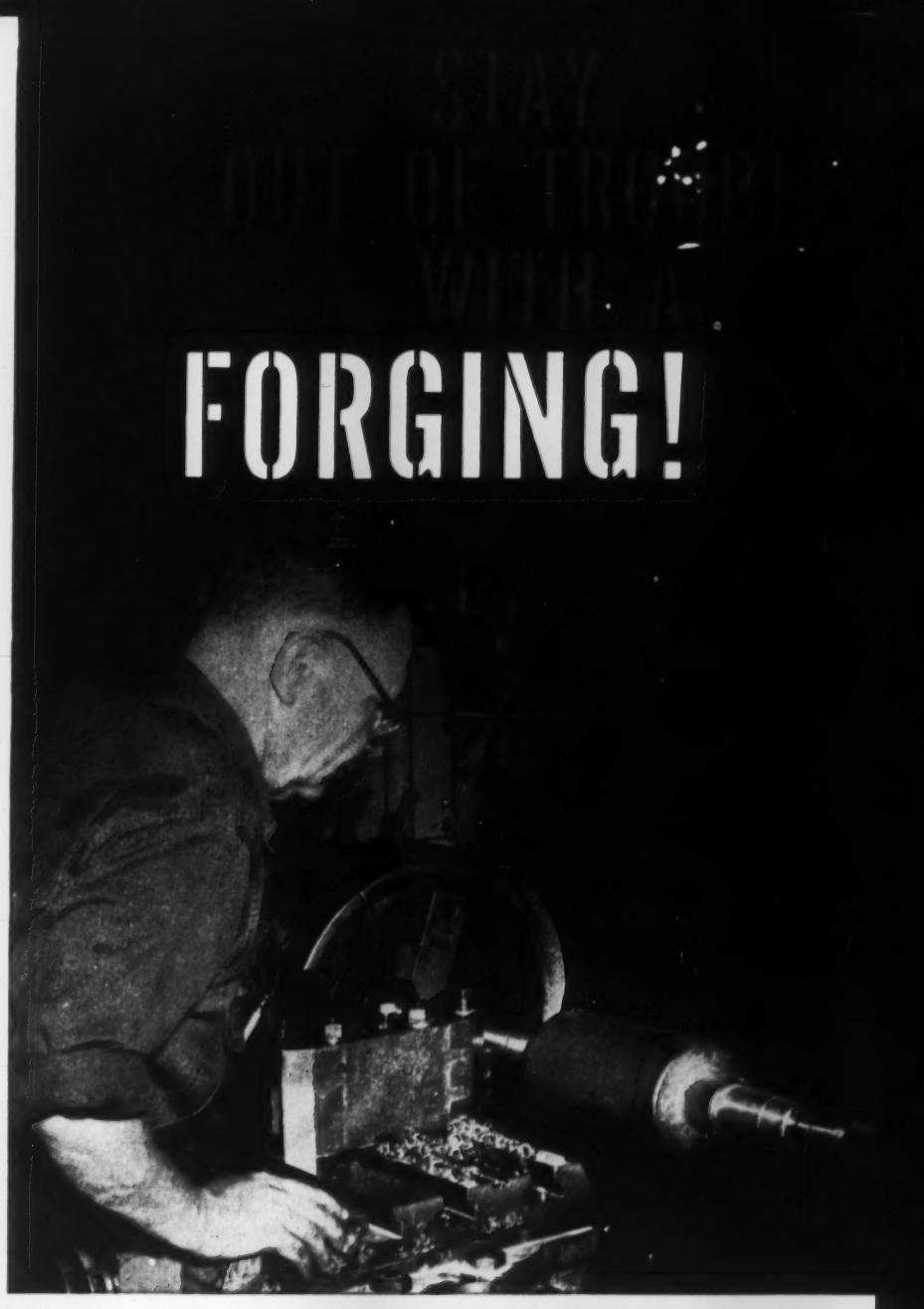


PHOTO - COURTESY CLEVELAND WORM AND GEAR CO.

The part illustrated above *will* become a component of the completed product — will *not* become a reject — BECAUSE IT IS A FORGING.

You get effective machinability because forgings are dense, homogenous metal, free of porosity and other flaws. Forgings start with *forging quality metal* which is improved by the forging process. This fact also offers advantages in heat treating and welding.

If you are experiencing a costly reject rate, find out how *forgings will help you.* Call in a forging engineer, and also send for the booklets offered below to learn the economies that can be gained by the use of forgings in your product.

Reduce your cost by using forgings. Send for booklets, ☐ "What is a Forging?" and ☐ "Management Guide to the Use of Forgings."

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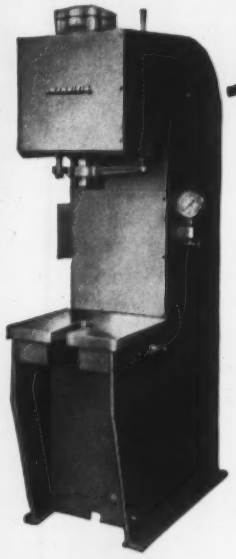
Prices complete with motors and starters F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.



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steel forms for concrete road, airport, curb and gutter and sidewalk construction; concrete finishing machines; and other concrete road building equipment. Donald T. Heltzel is general manager of the new subsidiary; J. J. Marcello is sales manager.

Minnich Machine Works, Waynesboro, Pa., maker of baling presses, has been acquired by **Elevator Engineering Co.,** Baltimore. Minnich operations are installed in a separate building at 1605 Ridgely St., that city. C. E. Marsh is president of both firms.

New Plastic Corp., Los Angeles, maker of surface protective hammers and plastic wall tile, purchased **Lansco Die Casting Co.,** El Monte, Calif. Lansco will be operated as a wholly owned subsidiary, with W. B. Lane continuing as president.

REPRESENTATIVES

Smitco Inc., Cleveland, appointed Empire Tool Co., Detroit, as national distributor of its shaving and skiving tools.

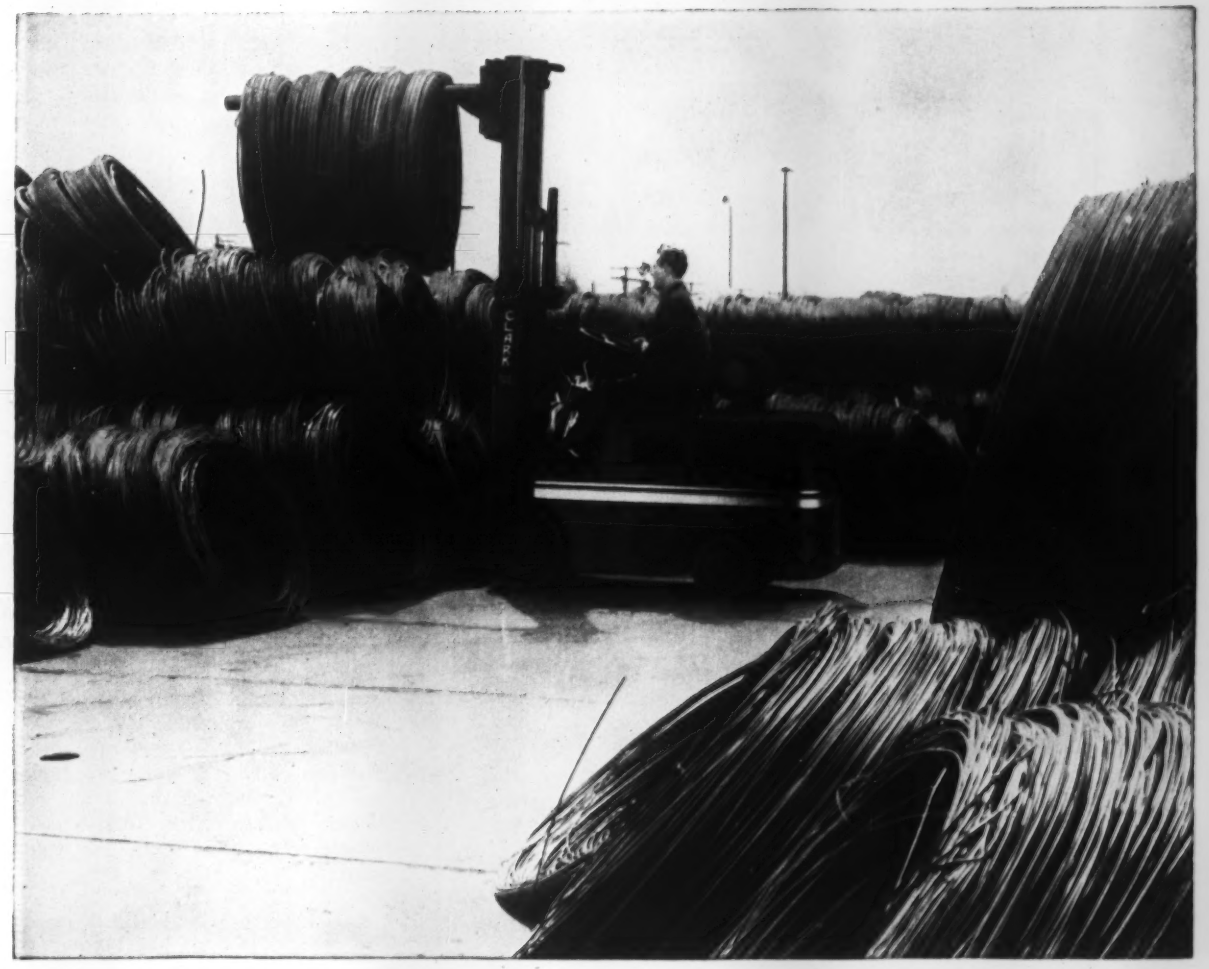
Pacific Steel Boiler Division, National-U. S. Radiator Corp., Johnstown, Pa., appointed J. Edwin Aspinall Co., Indianapolis and Ft. Wayne, Ind., a distributor in Indiana and southeastern Illinois.

Double A Products Co., Manchester, Mich., appointed Barker Rockford Co. as sales representative for its hydraulic control valves.

Kensington Steel Co., Chicago, appointed Bearing Industries Inc., San Francisco and Oakland, Calif., as northern California distributor for its Tractor & Construction Equipment Parts Division.

Yale & Towne Mfg. Co., Philadelphia, appointed Cardinal Carryor Co., Louisville, a franchise representative for the sale and service of its industrial lift trucks.

ABC Metals Corp., Denver, has been appointed a general line industrial distributor of Kaiser alu-



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Why not investigate the advantages of a U-L Approved, Clark *factory installed* LP-Gas system for your own operations. While at it, check the wide variety of special attachments available to handle practically any job. Your local Clark dealer will be happy to help—he's listed in the Yellow Pages under "Trucks, Industrial."

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Industrial Truck Division
CLARK EQUIPMENT COMPANY
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minum products in the Rocky Mountain area. The announcement was made by S. S. Inch, vice president, **Kaiser Aluminum & Chemical Sales Inc.**, Oakland, Calif.

Stanat Mfg. Co. Inc., Long Island City, N. Y., appointed F. D Ullman, San Francisco, a representative. Stanat makes rolling mills, gang slitters, roller levelers, wire flattening mills and related metal processing equipment.

Greenfield Tap & Die Corp.'s Horton Chuck Division, Windsor Locks, Conn., named Ross-Willoughby Co., Columbus, O., as its distributor in that area.

Chrysler Corp.'s Airtemp Division, Dayton, O., appointed Pugh Heating & Air Conditioning Co., Toledo, O., as distributor of its commercial air conditioning equipment, home air conditioning systems and furnaces.

United States Gauge Division of American Machine & Metals Inc., Sellersville, Pa., appointed M. S. Jacobs & Associates Inc., Pittsburgh, as a distributor in that district.

Osco Steel Co., Cleveland, was appointed a general line industrial distributor for **Kaiser Aluminum & Chemical Sales Inc.**, Oakland, Calif. Osco will carry stocks of aluminum sheet, rod, bar, wire and extruded shapes.

Cleaver-Brooks Co., Milwaukee, appointed Jim Marshall Sales Engineering Service, San Antonio, Tex., as representative for the sale of its boilers and equipment for the generation and utilization of heat.

ASSOCIATIONS

National Metal Trades Association, Chicago, inaugurated a material handling and plant layout advisory service. Irving M. Footlik was named to head the service.

Alfred Iddles, president, Babcock & Wilcox Co., New York, was elected president of **Atomic Industrial Forum Inc.**, that city.

Roebling drum packs are shipped on pallets unless otherwise specified. This gives you today's easiest, least expensive method of moving and stacking wire — with a fork truck, one man can do the work of ten.

Packed to save you money!

IN ADDITION to producing top quality high carbon wire, Roebling has developed many special methods of packing ...and some *one* of these, or some other method which may be developed for your specific requirements, may save a considerable amount of time and money in your plant.

Certain types of wire, for instance, can be packed in hexagonal fibre drum packs that provide superior protection and facilitate handling and storing wire. Drum packs do not have to be returned... save you bother, storage space and freight charges.

You *pay* for the best when you buy high carbon wire. Make sure you *get* the best, in wire and packing too. Always specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

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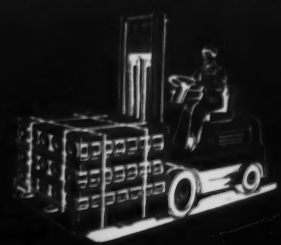
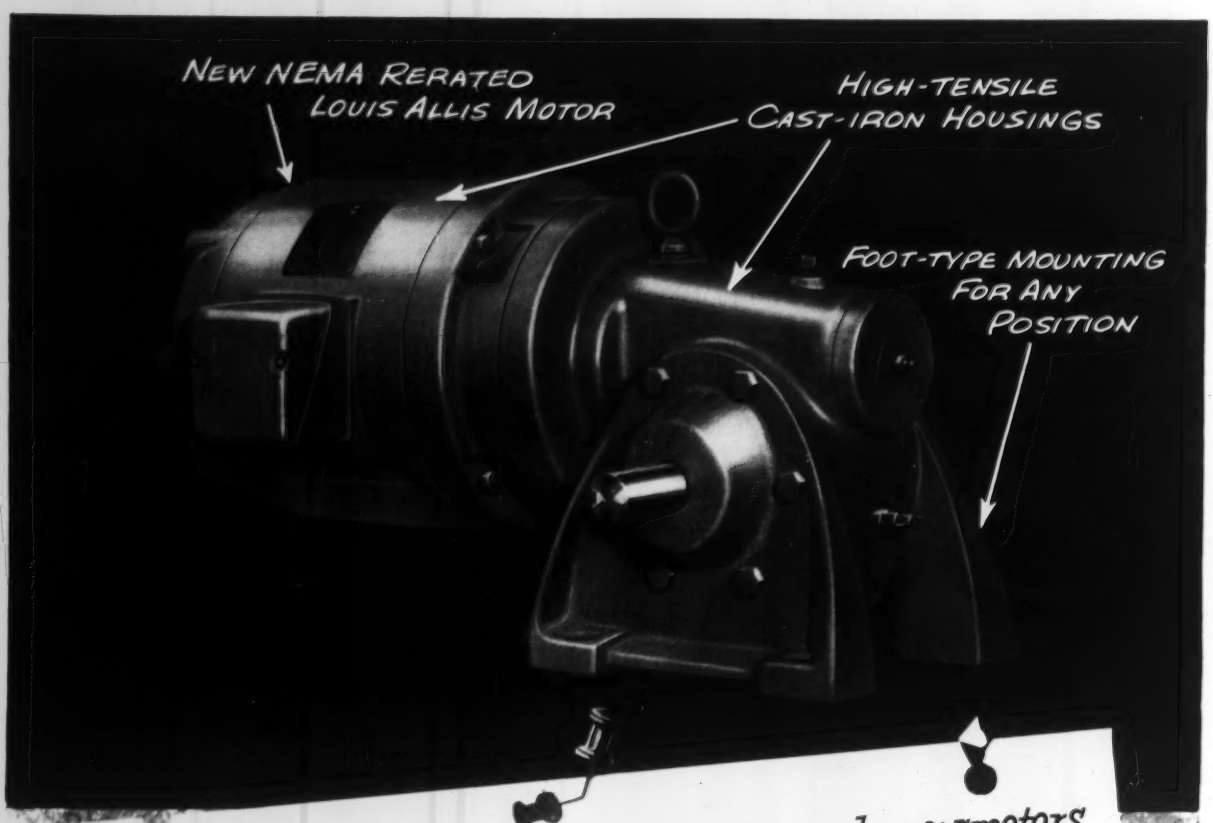


If you wish, Roebling spools will be delivered on pallets with separators, providing the easiest and most economical means of handling and stacking wire with fork truck.

OUTLOOK TECHNICAL OU



Louis Allis announces its L.A. line of right-angle gearmotors

Now available with new NEMA rerated L.A. motors for all applications — in sizes from 1/3 to 30 hp

Before we go into the many design features of this compact gearmotor, let's take a look at a few other advantages:

First of all, you can get either foot- or flange-mounted units. Secondly, you can have any motor enclosure you want. And finally, you can have any electrical or mechanical modification needed for any specific application.

In other words, here's a line of gearmotors ruggedly designed, versatile and efficient—to give you a sound answer to your right-angle gearmotor drive problems. Here's why:

- Both gear and motor housings are made of high-tensile cast iron to provide maximum strength, rigidity, and compactness.
- The worm, carefully machined from hardened alloy steel, is ground to close tolerances to give greater efficiency and longer life.
- The worm gear is cut from a high grade of wear-resistant alloy bronze.
- A double-row angular contact bearing and a ball bearing provide for radial and thrust loads on the worm shaft.
- The output shaft is mounted in tapered roller bearings for maximum load-carrying capacity.
- Ample oil-bath lubrication assures longer life and minimum maintenance.
- Special oil seals on all shafts keep the oil in--dirt out and permit any mounting arrangement.

Here's a line of right-angle gearmotors that's very easy to apply. Standard speed range from 7-1/2 to 300 rpm--special speeds also are available.

Flange-mounted right-angle gearmotor with new L.A. line explosion-proof motor

GM-103

THE LOUIS ALLIS CO.
MILWAUKEE 7, WISCONSIN

Technical Outlook

NO TWIST— "Small piping (½-in. and up) is cheaper when joined by welding rather than threading," says H. A. Sosnin, Tube Turns, Louisville. You get adequate results with lighter pipe, flow conditions are better and less maintenance is required. Schedule 40 pipe welded has a thicker wall than schedule 80 threaded, says Mr. Sosnin.

UPSETTING— Resistance welders cut fabricating cost of steel windows 40 per cent, according to Taylor-Winfield Corp., Youngstown. Sashes and frames which were cold headed and clinched required 100 per cent inspection. The maker, U.S. Gypsum Co., Warren, O., says the welders eliminate two operators and an inspector. Added benefits: Quieter operation and improved employee morale.

CERAMIC MAGNET— A new magnetic ceramic ($Ba\ Fe_{12}\ O_{19}$), produced without critical materials, is unaffected by external fields and is practically impossible to demagnetize. It can be molded into various shapes, is smaller, lighter and has longer effective life than metal magnets, says North American Philips Co. Inc., New York. Applications: Refrigerator and cabinet door latches, loudspeakers, television focusing yokes. It also will be used for motors and generators, oil filters, rotating mechanical couplings, cushioning devices and toys.

PROGRESS—Two new tungsten base alloys, WI-11 and WI-24, have reached the evaluation stage. W. L. Long, president, the Tungsten Institute, reports that master molds have been received at Stanford Research Institute from Curtiss-Wright and Pratt & Whitney. Stanford will produce sample castings of turbine blades and vanes. The alloys are said to stand operating temperatures several hundred degrees higher than any alloy yet developed; their recrystallization temperatures and melting points are claimed to be considerably above those of present nickel and cobalt base superalloys.

FORMING SUPERALLOYS— There's talk of a new production technique for cold forging superalloy metals. It's based in a joint research program of Impact Products Inc., Orangeville, O., and Townsend Co., Ellwood City, Pa. The two-year project is termed "highly successful."

POWDER POWER— Look for metal powder parts to turn up soon in automobile starters. Metal powder pole pieces are being used successfully in a 5-hp industrial truck motor. Powder stators and pole pieces have a good foothold in heater and other small direct current motors for autos.

METALCUTTING FACT AND FANCY— Figuring that U.S. industry wastes half its $10 billion annual metalcutting costs in chips, the American Society of Tool Engineers has awarded a $37,600 contract to see if "a better understanding of the metalcutting process" can be developed. Work will be done at Battelle Memorial Institute, directed by F. W. Bolger, chief of the ferrous metallurgy division.

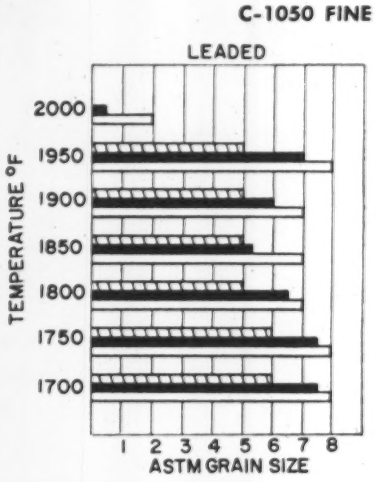
HIGH PRESSURE BRAIN— An electronic brain teamed with a technique developed by engineers at Blaw-Knox Co., Pittsburgh, solves stress problems in high pressure steam piping systems 20 times faster than the classical method. Results are accurate to six significant figures; no short cut approximations are needed. It's available to consulting engineers, companies or individuals who design power piping systems.

Metalworking Outlook—p. 73 Market Outlook—p. 157

Leaded Vs. Nonleaded Steel

(C-1050 and C-1141)

1. Brinell hardness:	**No significant difference**
2. Yield and tensile strength:	**No significant difference**
3. Grain size:	**A little smaller in leaded steel**
4. Charpy impact:	**Transition temperatures average 22°F lower**



Austenitic grains in leaded and nonleaded steels. White bars are mini-

How Much Does Lead Change Steel?

It does much to improve metallurgical properties, says Inland Steel. Here are results of tests on C-1050 and C-1141 steels. Impact transition temperatures average 22°F lower

METALLURGISTS have debated several questions since leaded steels were introduced, including: Does lead hurt tensile and yield strength? What about brittle fracture?

To get some answers, Inland Steel Co., East Chicago, Ind., tested three heats of C-1050 and C-1141 steels, leaded and nonleaded.

A. P. Weaver, Inland's senior metallurgist, gave ASM members the results week before last at their convention in Cleveland. Summarized above, they point up the fact that lead's benefits aren't restricted to machinability.

Scope—To reduce the variation in the tests, two consecutive ingots were taken from the middle portion of selected heats. Lead was added to one.

The ingots were rolled into rounds. All lots were normalized at 1650°F, quenched in oil at 1550°F, and drawn for 2 hours at 100°F to check their impact resistance at higher hardnesses.

Impact—In the Charpy V-notch tests, most of the leaded samples showed lower transition temperatures than nonleaded ones of the same grade and composition. Below the transition temperatures, leaded steels had higher impact energies than nonleaded ones; above, they had lower impact values.

In all cases, normalizing increased resistance to impact. A quench and a draw gave still higher impact and lower transition temperatures.

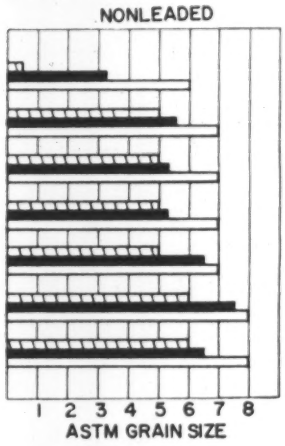
Results—Generally, you can draw these conclusions from Inland's tests: 1. Lead lowers the Charpy transition temperatures. (It's probably due to the moderate grain refinement.) 2. Heat treatment lowers the transition temperatures on coarse-grained C-1050 steel—15°F in hot rolling, 30°F after normalizing and 50°F after quenching and drawing. 3. Lead refines coarse grained C-1050 steel. It has less effect on fine grained material.

Greater Spread—At the lowest temperatures, the fractures of all samples were brittle. On all but the normalized, quenched and drawn, coarse grain series, the fractures remained brittle up to about the transition temperatures. The fractures became less brittle and more ductile while going through the transition range until at higher temperatures the fractures were completely ductile.

Brittle fracture disappeared completely at lower temperatures on the normalized series of both the coarse and fine grained C-1050 steels than on either the straight hot rolled or the quenched and drawn series. Fracture curves generally agreed with the impact energy curves.

Keyhole — A series of Charpy Keyhole (impact) tests was made on the C-1141 lots. In each of the four conditions (hot rolled, cold drawn, quenched and drawn, and normalized), the leaded and nonleaded samples came successively

GRAIN PRACTICE



mum; black show the predominant and cross-hatched ones the maximum

How much does lead change steel?

Sample	Hot Rolled	Normalized	Quenched & Drawn
C-1050 (Coarse Grain)			
Leaded	160°F	85°F	120°F
Nonleaded	175	115	170
C-1050 (Fine Grain)			
Leaded	110	45	30
Nonleaded	100	55	45
C-1141			
Leaded		30	
Nonleaded		55	
C-1141 (Charpy Keyhole)			
Leaded		—20	
Nonleaded		—10	

Charpy V-notch transition at 15 ft-lb energy level

Did you get your copy of the Metal Selector for Special Alloys? Published in the Oct. 1 issue of STEEL, it lists more than 100 leaded steels being produced. Get your free copy by writing Editorial Service, STEEL, Penton Bldg., Cleveland 13, O. In quantities, it's 10 cents a copy.

nearer to having the same impact energies. Inland assumes that it resulted from hot mill finishing practice.

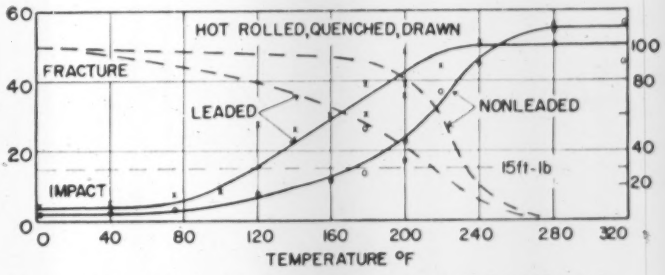
The 15 ft-lb energy level used for ship plate is too low for the normalized and for the quenched and drawn lots, Inland concluded.

Grain—Photomicrographs of the test samples support the fact that lead refines grain structure.

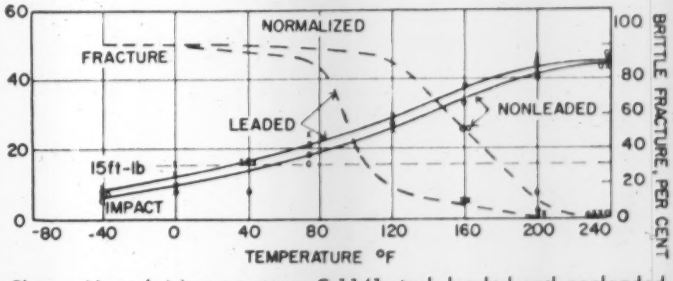
Inland's work also supports the findings of others on grain refinement and transition temperatures: They drop about 25°F per ferritic grain size number.

Observation — E. W. Husemann, chief metallurgist, Copperweld Steel Co., Warren, O., commented that much more research like this is needed on all grades of steel.

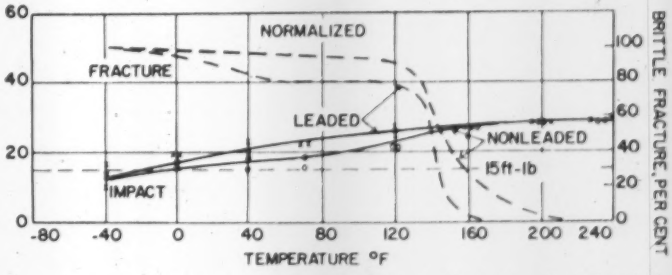
It is his opinion that research will show that leaded and nonleaded steels can be used interchangeably, and that the mechanical properties of any steel are improved by the addition of lead.



Charpy V-notch impact tests on coarse grained, C-1050 steel



Charpy V-notch impact tests on C-1141 steel, leaded and nonleaded

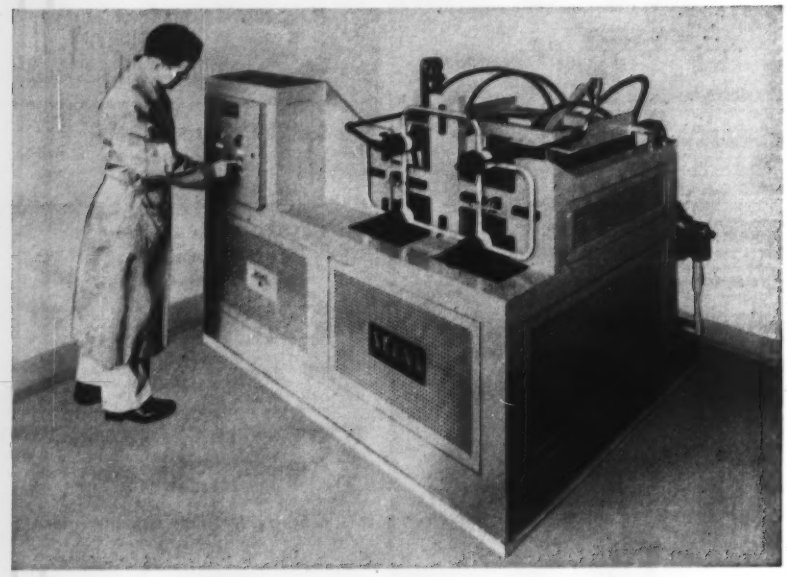


Charpy Keyhole impact tests on C-1141 steel, leaded and nonleaded

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

Pushbutton controlled, automatic machines make fast, accurate and uniform brazes at low unit cost. Unskilled operators can assemble the parts and flux the joints

By WILLIAM B. TROUPE
Application Engineer
Selas Corp. of America
Dresher, Pa.



1—Pushbutton machine brazes tubular aluminum bedframe assembly

Gas-Fired Machine Brazing

GAS-FIRED machines are most effective when designed and custom-built to do a specific range of jobs. An exact time-temperature cycle is established for each brazed assembly.

Unskilled operators can assemble the parts, flux the joint areas and place the brazing alloy (usually preshaped from wire or sheet).

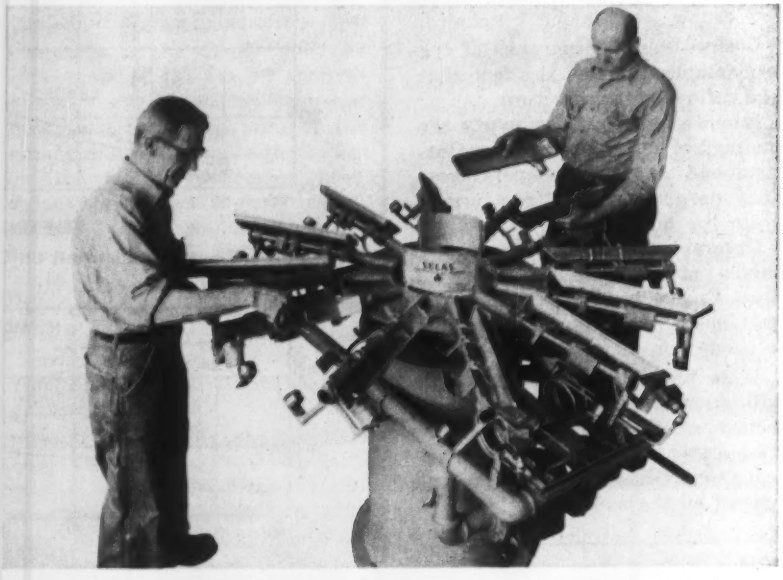
Automatic—The result is pushbutton brazing. The operator simply loads an assembly into an appropriate fixture and starts a fully automatic brazing process by pushing a button (photo 1). Or he can load one assembly after another into a continuously operating machine.

Temperature control usually is achieved by stabilizing the heating rate and electrically controlling the time of heating. The assembly may be moved to and from the workpiece, or the fuel flow may be controlled at one, two or more levels to produce the heating cycle required.

Heating Rate—Brazing heat is stabilized by mixing fuel gas with air and pressurizing the mixture in a gas combustion controller; using burners which are designed to produce the required flame characteristics; and establishing a fixed mechanical relationship between burners and workpiece.

Processing time for each assembly then can be established by using a fuel flow valve, controlled by an electric timer; automatically retracting the burners after a fixed interval; or continuously moving or indexing workpieces past a series of burner stations at a pre-established rate.

Where exacting control of final temperature is necessary, the end of the heat processing cycle can



2—Two brazing operations are teamed on one machine which silver brazes automobile radiator top and bottom tank assemblies simultaneously

be established readily.

Rapid Heating—The basic problem in brazing is bringing the mating surfaces and the filler material to brazing temperature at the same time. High production rates require that the temperature be reached swiftly, be held just long enough to insure wetting of all mating surfaces, and at no time exceed the flow point of the filler by more than a few degrees.

At its simplest, brazing involves an uncomplicated assembly of simple parts of the same material and about the same thickness, and a filler alloy which melts at a considerably lower temperature than the parent metal.

Radiator—An example of this is the lap joint between two pieces of brass of about the same gage, produced on the machine in photo 2. The assemblies are top and bottom tanks for automobile radiators; the hose connection is brazed to the tank body. In this case, high production—600 pieces an hour—is the important consideration.

With the indexing horizontal dial turning clockwise, one operator loads top pieces for brazing (at heating stations in background), while the other loads bottom pieces for brazing (at heating stations in foreground).

Bicycle Fork—A more difficult assembly requires brazing seven steel parts to form a bicycle fork. The machine in photo 3 turns out 300 assemblies an hour. Several bicycle manufacturers now are using machines of this type, not only for the conventional fork shown, but also for simpler tubular fork designs which this brazing method makes practical.

The fork is moved past the heating stations to bring the multiple joint area to 1750°F in 72 seconds. The operator loads assembled-and-fluxed forks, with copper brazing alloy preplaced, onto fixtures so that each Y-shaped joint area rests in a molded and fired ceramic semi-furnace. Perforated refractory burners direct flame into the semi-furnace section at each station. After the last heating station, the fork is tilted forward to facilitate unloading.

In some instances, parts are air cooled between the final heating station and the discharge station.

Socket Wrench—Air quenching also is used for hardening brazed steel assemblies, using the brazing heat. This is true of a socket wrench assembly. The socket is brazed to the handle shank at a rate of 400 an hour, and the socket is hardened by a blast of compressed air after the braze has been made.

A variety of sizes of wrench and shank can be handled by the one machine. Burners concentrate heat in the immediate area to be brazed and hardened. Each of the burners is a miniature, ceramic-lined furnace in which the fuel is completely burned.

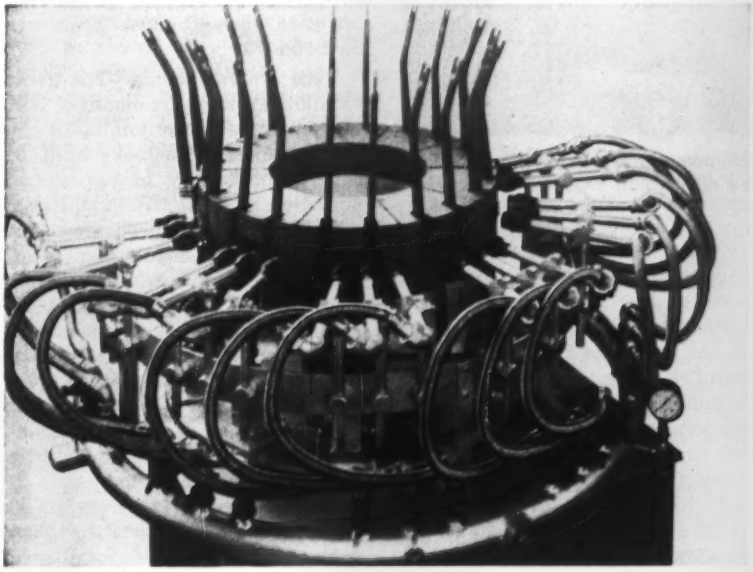
Capacitor Terminal — Localization of heating sometimes is required to prevent damaging delicate materials in the vicinity of the joint. In fabricating the capacitor terminal in photo 4, an aluminum-bronze stud is silver brazed to a steel cap imbedded in a glass stand-off insulator. A copper wire is brazed simultaneously into the center of the stud.

The ring shown is the brazing alloy for joining stud to cap; a pellet of filler material makes the wire-to-stud joint. The stud must be heated to 1250°F through to the center, but the glass, only ¼-in. from the joint, cannot be heated beyond 130°F without breaking.

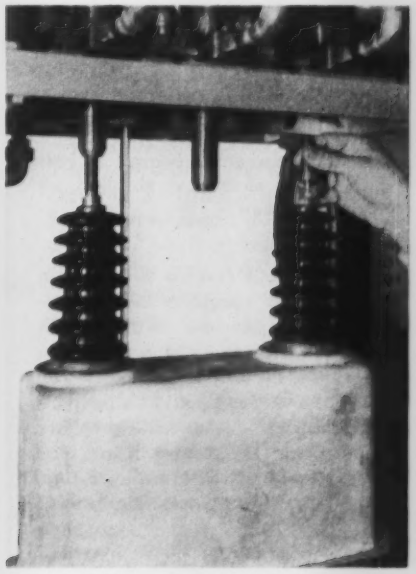
To accomplish this, the stud is heated rapidly by two burners until the filler melts, then the burner manifold retracts before the glass overheats.

Convector — Localized heating becomes a problem when the function of the assembly being joined is to dissipate heat. This usually is the case when a heat exchanger —an air-cooled condenser or room heater, for example—is involved.

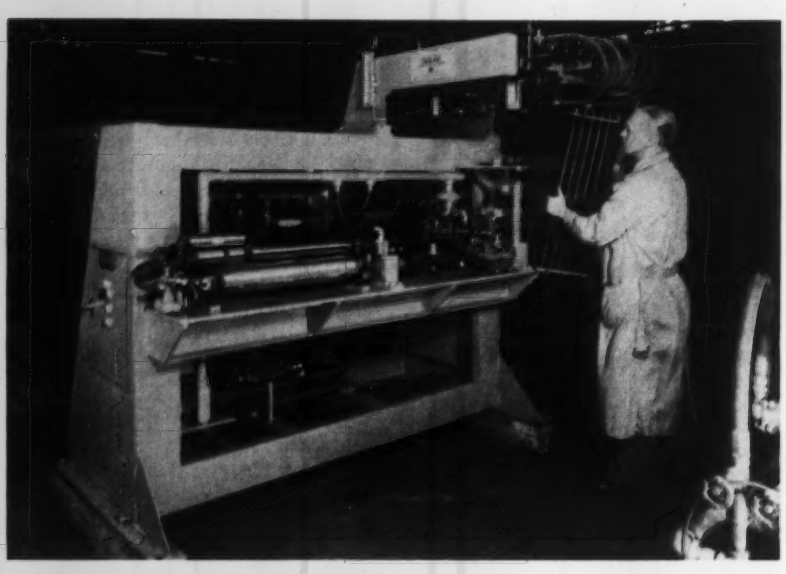
A particularly complex brazing problem was a convector assembly of aluminum-finned copper tubes



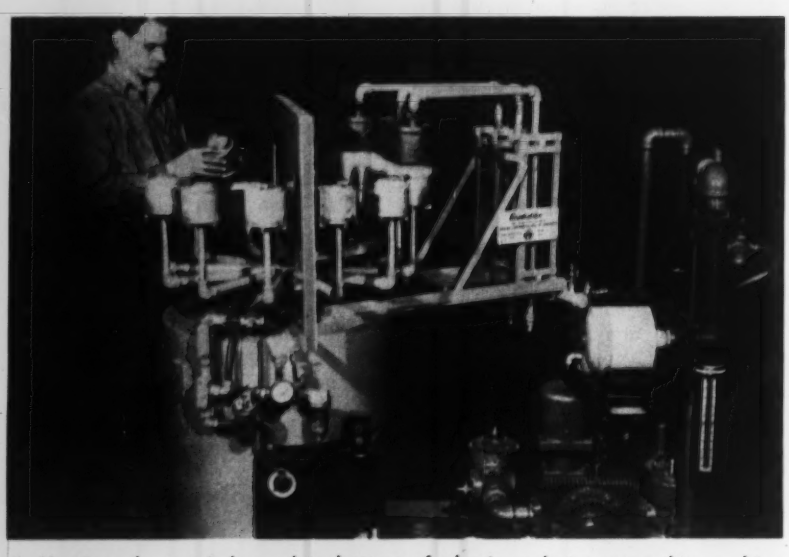
3—Bicycle fork machine brazes seven joints simultaneously at 1750°F. Production is 300 assemblies an hour



4—Assembling large capacitor terminal for automatic silver brazing



5—This tube-return-bend brazing machine has been integrated into an existing conveyor system



6—Heating element is brazed to bottom of aluminum hot cup on this machine which has all electric, combustion, air and timing controls mounted on a structural steel frame

brazed at each end to a cast iron header. One machine had to accommodate headers varying in length from 18 to 72 in. and having two, three, four or five tubes. The convector is designed to dissipate heat rapidly. Also, the brazing temperature is greater than the melting point of the aluminum fins, only $\frac{3}{8}$-in. away from the brazed joint.

Brazing Machine — A machine was designed to do the job. The operator places the assembled convector, fluxed and with filler preplaced, on the fixtures. Pressing a button sets the burners into position and increases fuel to full flow. When the braze is completed, after $2\frac{1}{2}$ minutes, the manifold is automatically retracted and the burners idled.

One of the largest heat exchangers to be machine brazed was a refrigerator core 10 ft in diameter. Twenty-six 2 in. diameter copper tubes were brazed at 1145°F to each of the two $1\frac{1}{2}$-in. thick tube sheets by a panel of 45 radiant burners. To overcome the ability of the workpiece to draw off heat, the burner panel developed $1\frac{1}{2}$ million Btu an hour, brazing each tube sheet in less than 8 minutes.

Aluminum — Brazing aluminum is difficult because a spread of less than 50°F exists between the flow point of the filler material and the melting point of the parent metal. The end temperature—in the region of 1150°F—must be held to a tolerance of about ±20°F.

When the problem of close temperature control is combined with the efficient heat conduction of a heat exchanger, a situation exists as typified by an all-aluminum air conditioner core.

Salt bath brazing of this core produces a satisfactory mechanical assembly, but the tubes are not satisfactorily sealed at the end plates. A continuous fillet of filler material must be made around each of the 21 elongated tubes at the point where the tube projects through the end plate.

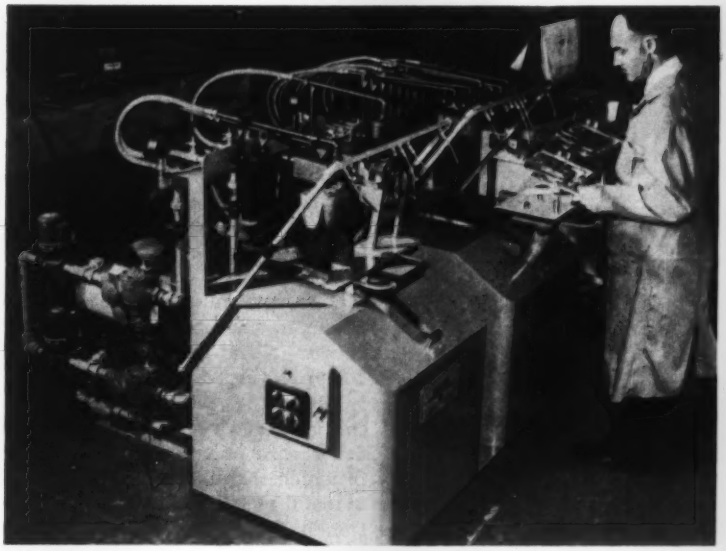
Solution—The core is brazed on a machine in which fixtures on an indexing dial automatically open and close for loading and unloading.

Multiple-burner panels bring the top of the core to brazing temperature evenly. Burner panels can be adjusted to handle a variety of core sizes. Each core is run through the machine twice, once for each end; 55 cores are sealed an hour.

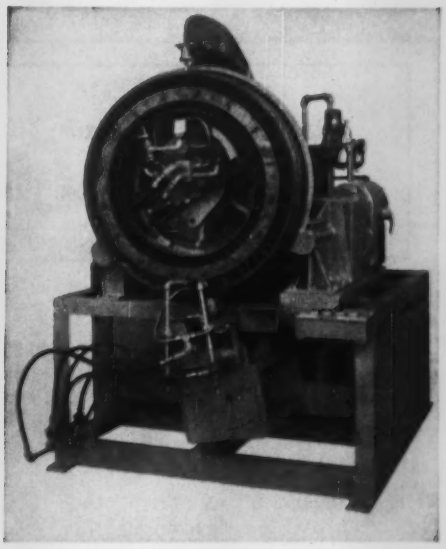
Tube Return Bends—The greatest number of heat exchanger brazing jobs involve the joining of tube return bends. Machines built for this purpose vary in appearance, since each must fit a different workpiece shape, production line situation and schedule.

The core may have one or several rows of aluminum tubes and aluminum or steel tube sheets. In most cases, the fins are aluminum. The single station return bend brazing machine in photo 5 uses burners which produce thin hot spear-shaped flames; it is fitted into a conveyor system.

Another tube return bend machine uses a reciprocating worktable that lets the operator unload and reload one station while a heat exchanger is being brazed in



7—Combination brazing-soldering machine completes seven joints on four stations. Operator loads base assemblies for silver brazing (rear) while kettle is completed by soldering (front)



8—This machine brazes hollow blades to the inner and outer shroud rings of a jet engine compressor

the other. A radiant panel supplies the heat.

Hot Cup — The fabrication of plug-in electric utensils usually requires brazing of a metal-sheathed heating element to the bottom of the utensil.

Photo 6 shows an aluminum hot cup with an aluminum-sheathed heating element being brazed to the bottom. This gas-fired automatic brazing machine is completely self-contained, requiring only the attaching of utilities.

Air equipment for the indexing dial conveyor, the timer and the electrical controls are grouped at the side of the machine nearest the camera. Behind the machine is the gas combustion controller, gas and air Flo-Scopes, and other combustion equipment.

Utensils — Spouts, handles and other parts of cooking utensils also are machine brazed. The dual machine in photo 7 brazes and solders seven joints.

The heating element, two studs, a thermocouple support and a clip are silver brazed to the bottom of a copper tea kettle on one section. The operator initiates this cycle by moving the fixture to the burners and loads the other section while the cycle is completed.

In the second section, the completed base and spout are soldered to the kettle body under similar automatic control. When each unit completes the braze, the workpiece is automatically removed from burner area for unloading.

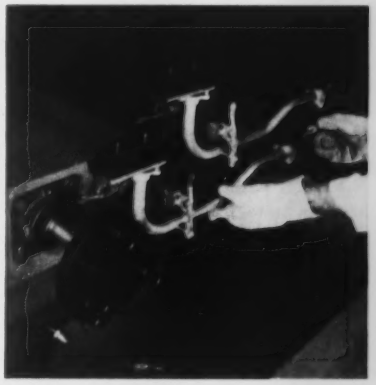
Design Tool—In some cases, the ability to braze by automatic machines permits significant design changes. One occurred in the manufacture of compressor blades for jet engines.

Under certain conditions, aircraft equipped with these turbines iced at the entrance to the compressor. It was felt that hollow blades, brazed to the inner and outer shroud rings, could alleviate this. Heated air from the combustion chamber could be introduced through each blade.

Photo 8 shows the machine developed to do this job. In brazing 64 blades to the shroud rings, 128 joints are made, two at a time, on an automatic cycle. The entire assembly is clamped rigidly in a water cooled fixture to maintain concentricity and flatness.

Gas Pumps—A manufacturer of service station gasoline pumps replaced copper tubing and brass fittings with less expensive aluminum tubing and cast aluminum fittings. One machine had to be able to braze 13 tube shapes. Laboratory tests indicated another requirement: Brazing was successful only when the tube being brazed went down into the fitting.

The machine in photo 9 was developed to meet those requirements. The operator selects one of 13 fixtures, and loads two assemblies with preplaced brazing alloy. Clamps, holding each assembly rigidly in position, maintain the proper relationship between flanges and tubing.



9—Thirteen assemblies of shaped aluminum tubes and cast aluminum fittings can be brazed on this machine

Three automatic cycles are possible: Brazing tubes whose ends are at 180 or 90 degrees to each other, or brazing tubes at one end only. The production cycle remains constant at one braze a minute.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Rutile at $200 per ton: Titanium in it costs 17c lb

Ilmenite at $20 per ton: Titanium in it costs 2.5c lb

Cheaper Ore for Titanium

THE FIGURES above portray the big incentive for developing the ilmenite route to titanium metal.

A new process that could show the way was described to the Electrochemical Society in Cleveland this month by J. H. Brennan, chief metallurgist, Electro Metallurgical Co., a division of Union Carbide & Carbon Corp., New York.

Ilmenite is reduced in an Acheson-type furnace. Magnetic separation is used to remove the iron from the reduction product.

The titanium industry today is based on the more expensive rutile ore because it is purer and easier to process than ilmenite. Aside from its apparent cost disadvantage, rutile poses another problem: Will its supplies meet the needs of this growth industry?

Process—All commercial sponge is produced by the reduction of titanium tetrachloride. Other practices, such as the electrolytic process or the dissociation of halogen salts, are being investigated, "but as yet we have seen no commercialization of them," says Mr. Brennan. The product of the Electromet process can be chlorinated to produce a high grade titanium tetrachloride.

The two important ores are rutile—usually a sand concentrate with about 95 per cent titanium dioxide and various ilmenites, which contain 35 to 60 per cent titanium dioxide.

Since rutile occurs as relatively pure titanium dioxide, it can be chlorinated to titanium tetrachloride with a minimum of undesirable by-products.

With ilmenite it's different. Since it's essentially an iron titanate ($FeO.TiO_2$), direct chlorination produces large amounts of ferric chloride. This ups the cost of chlorination and makes for a difficult disposal problem.

Removes Iron — In the Electromet process, ilmenite is partially reduced by carbon to a titanium oxycarbide in a resistance furnace. Iron is separated from it magnetically. The process works on Canadian ilmenite containing as little as 40 per cent titanium dioxide and on foreign and domestic ores with as much as 60 per cent titanium dioxide.

The table below shows a typical charge using Florida ilmenite. Sawdust and water are included to improve permeability for free evolution of gas.

Operation — A central core of graphite or carbon is used to give the current an initial path. As the run progresses, the solid product of the reaction becomes the conductor.

In a typical run, explains Mr. Brennan, carbon monoxide flames show up about 30 minutes after the power is turned on and burn freely over the top of the furnace charge. The reacted product is a dense core of titanium oxycarbide in which metallic iron is dispersed in small globules. Power consumption is 2 to 2.5 kw-hr per pound of product.

The product is crushed to 48 mesh and iron is removed by magnetic separation. An analysis of the magnetically separated titanium oxycarbide produced from Florida ilmenite is given in the accompanying table.

Follow Through—Mr. Brennan reports that this product has been chlorinated on a large scale to titanium tetrachloride. The threshold temperature for chlorination to start is about 400°F lower than it is for rutile-carbon mixtures in use today. Also, the higher titanium content of the oxycarbide—68 per cent vs. 58 for rutile—increases the output of the chlorinator. Sodium reduction of this titanium tetrachloride after copper purification and distillation produces metal of a quality equivalent to that made from rutile.

Electromet has applied for patents covering several features of the process and furnace design. Mr. Brennan says a semicommerical plant has been designed and its construction is "imminent."

How Ilmenite Becomes a Rich Titanium Ore

Analysis of Florida Ilmenite (Per Cent)	
Titanium (TiO_2)	39.5 / 59.14
Iron (FeO)	25.90 / 33.44
SiO_2	0.16
CaO plus MgO	0.51
Al_2O_3	0.50
Total	93.75

Analysis of Rutile (Per Cent)	
Titanium (TiO_2)	58.3 / 97.18
FeO	0.37
SiO_2	0.50
Total	98.05

Typical Charge for 30-Ft. Long Furnace Using Florida Ilmenite	
Ilmenite	77,000 lb
Petroleum Coke	13,300
Sawdust	6,150
Water	3,850
Total	100,300 lb

Analysis of Magnetically Separated Product (Per Cent)			
Titanium	68.08	Vanadium	0.09
Iron	1.96	Chromium	0.27
Carbon	9.34	Zirconium	0.08
Silicon	0.04	Manganese	0.70
Calcium Plus Magnesium	0.43	Phosphorus	0.008
Aluminum	0.50	Nitrogen	0.42

Total 81.92 per cent
Oxygen (by Difference) 18.08 per cent

What the process does: The ore is upgraded from a titanium content of 39.5 per cent to the 68 per cent nonmagnetic oxycarbide product. This is a substantial improvement even over rutile which has about 58 per cent titanium. The titanium to iron ratio is improved from 1.5 to ilmenite to 34.7 in the beneficiated furnace product. In effect, impurities are minimized because of the large increase in titanium content of the beneficiate.

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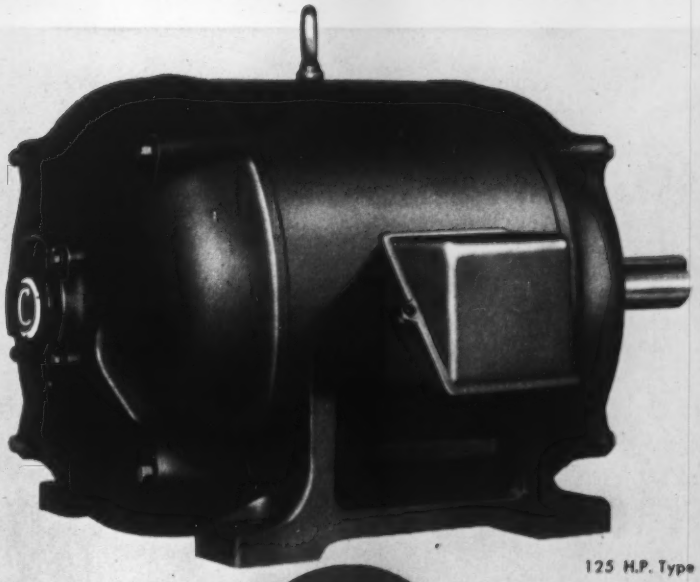
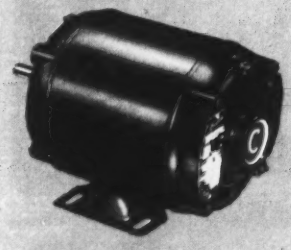


125 H.P. Type SC

small as 1/20 H. P.



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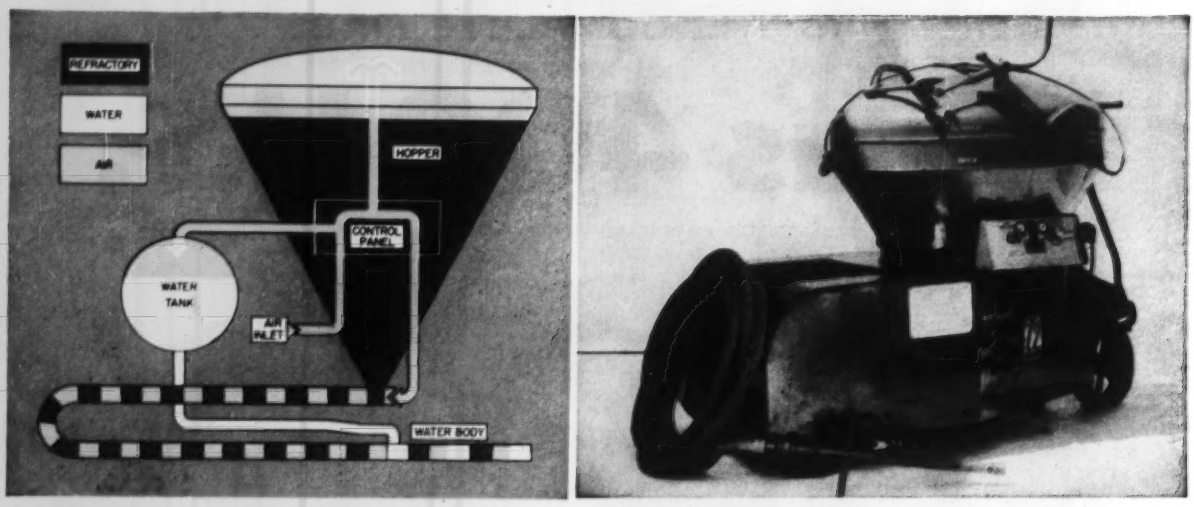


Drawing of refractory gun shows flow of air, water and refractory. At right is the BRI Gun, Model A-20. Self-contained, 80 gallon water tank is in the chassis between the two rear wheels and bottom of hopper

Refractory Gun Repairs Hot Furnace

There is no need to shut down an open hearth or cut back on fuel when using this new tool. It repairs skewbacks and backwalls in minutes, cuts costs

TIMELY maintenance of open hearth backwalls and skewbacks during a campaign pays big dividends at rebuilding time. It repairs damage from spalling brick thereby reducing silica runs and the amount of replacement brick required.

But shutting down the furnace to make repairs or emplacing many thin layers of refractory on the deeply eroded spots in the brickwork is time consuming and therefore costly.

Refractory Gun — Basic Inc., Cleveland, has introduced a refractory gun with a self-contained water tank that can emplace a ton of refractory on skewback or backwall in a few minutes at any time in the furnace cycle.

Using the BRI Gun, Model A-20, it is simple to fill holes in the brickwork which are a foot or more deep. The only limiting factor in the thickness of the refractory patch is the capacity of the gun (20 cu ft, or about a ton of most granular refractories).

Time Saver — The gun shoots ramming mixes as well as gun refractories. Mixing the refractory with water and shooting it in place at 400 lb a minute means a tap hole can be piped in 5 minutes or less. A large hole in the slag line can be filled in 2 minutes.

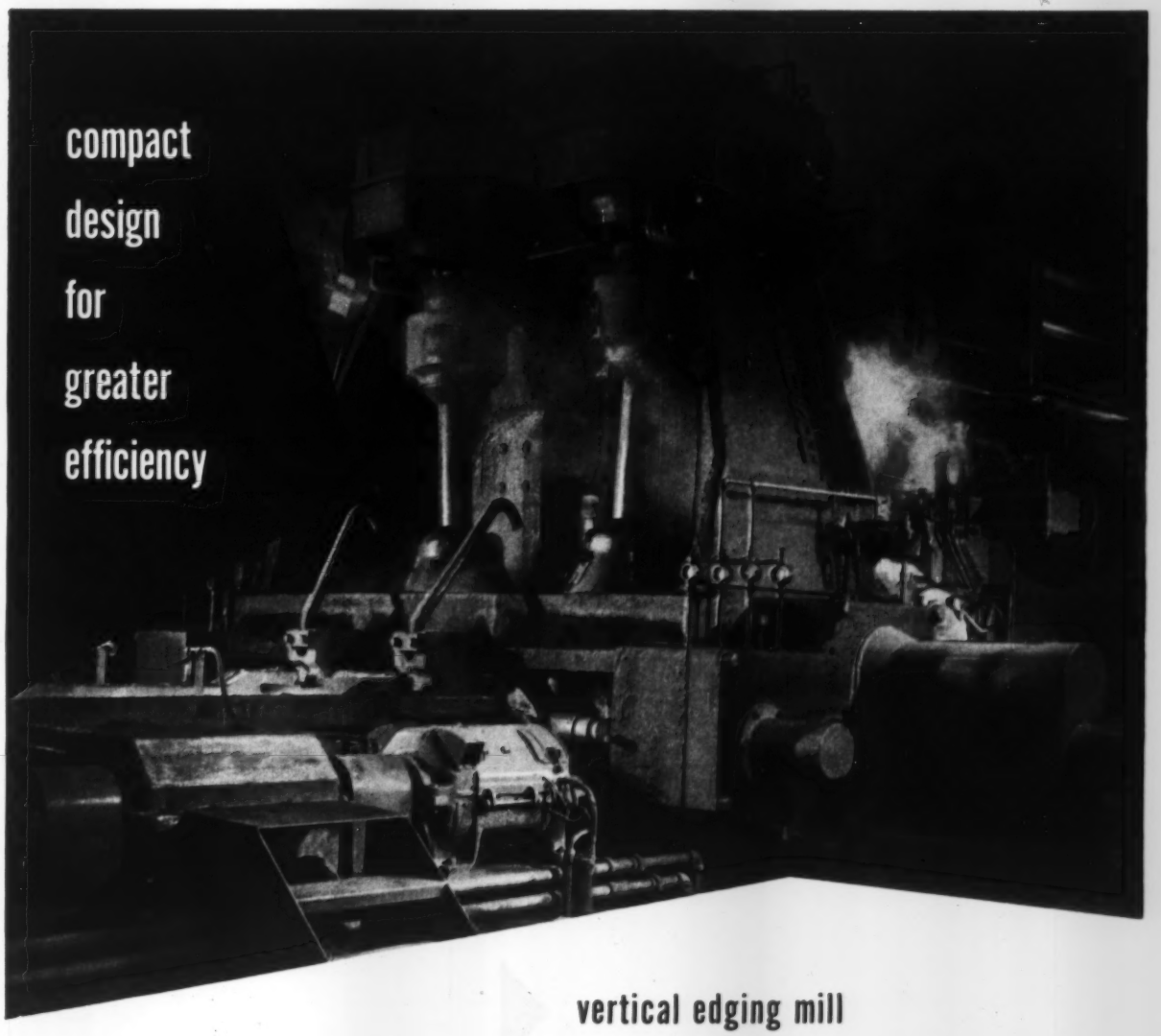
The refractory gun is undergoing tests at several large steelmaking plants. On-the-job results corroborate laboratory tests. Basic Inc. adds a word of caution: It is necessary to assign competent crews to the gun from the moment you bring it into the shop. Only in this way can full advantages be derived from the BRI gun, or any industrial appliance.

Water Tank—The success of the new gun is attributed to its self-contained, pressurized water tank. Its capacity of 80 gallons lets the operator shoot at a high rate and still have enough water to supply the proper refractory mix continuously.

Delivery rate of the gun is a straight-line function of the pressure on the refractory hopper. At a hopper pressure of 20 psi, the gun shoots 61 lb a minute. At 40 psi, it shoots 145 lb a minute. At 60 psi, it shoots about 428 lb a minute.

High Rate Best — Extra water must be used to keep the shooting pipe from bending at low delivery rates: 1. When the shooting pipe is in the flame. 2. When shooting a hot furnace. This usually exhausts the water supply before the hopper is emptied. It is best to shoot backwalls and skewbacks in hot furnaces at the highest possible rate.

The drawing above shows how the gun works. Air pressure forces refractory in the hopper to flow through piping into the water body where it mixes with water, which also is under pressure. Air forces the mixed material out through the shooting pipe and into the furnace.



vertical edging mill

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Chrysler finds a better way to do it. Workman here is radial draw forming a new style drip rail said to be uneconomical to make conventionally

Auto Maker Takes Up Draw Forming

Fast, accurate contouring in several planes offers new opportunities in forming design. Here's a look at what one automaker is doing with it and a hint on what's ahead

THE auto worker above is forming a drip rail for a 1957 Chrysler.

He is using a radial draw former, a tool familiar to many U.S. airplane builders.

It's getting the red carpet treatment in Detroit because it's 200 per cent faster and more accurate than conventional methods: Cross sections and contours, for example, are consistently accurate to 1/64-in.

Design—Like many auto designers, Chrysler engineers have been looking for ways to escape the limitations of conventional dies. The number of orders for machines from the Cyril Bath Co., Solon, O., suggests that they have found an answer.

Chrysler took to the method because it needed a stronger roof rail for the pillarless, four-door hardtop. Wrap-around windshields and backlights added to the problem.

Designers took a hard look at the drip rail which did nothing but carry off water (like the gutters on your house). To make it an integral part of the roof rail meant expensive dies and hand welding to join several pieces in the body. A stamping press for such parts might be as large as 1500 tons, use outsized dies.

The redesigned roof rail incorporates a wider drip rail with structural offsets and bends. The new piece is simpler, stronger and easier to use.

Stretch—Working with the Bath company, Chrysler engineers formed the first pieces on a standard radial draw former. It was effective but slow.

Bath engineers came up with a special machine that loads, cycles and unloads automatically. It makes between 200 and 300 parts an hour.

Here's how it works:

A metal strip is fed automatically into the machine, and the ends are gripped by hydraulic heads mounted on cylinders which give the material a 6-ton stretch. Two die elements are rocked into each other under 4½-tons of pressure. The dies open, the formed part is ejected, and a new piece inserted automatically.

Pleased—Chrysler expects to use radial draw forming more extensively. On order is equipment to make door pillars, quarter panel pillars, corner strainers, roof braces, and luggage compartment drain troughs.

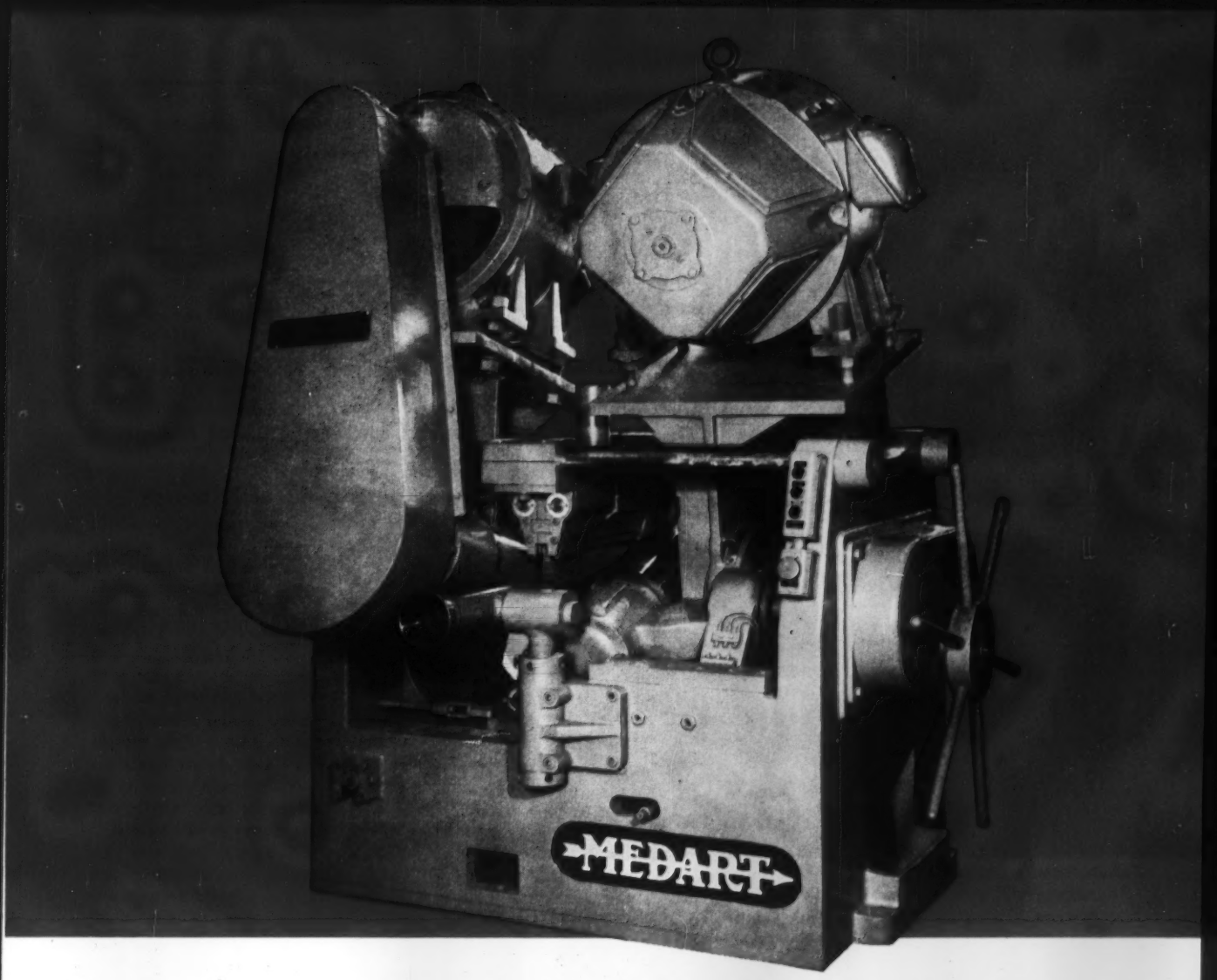
One of the features which is said to please Detroit's engineers is the testing program. In one case, 30,000 pieces were run to prove the machine before it was accepted for delivery.

The key to the radial draw former's popularity is its ability to form all types of metal, regardless of hardness, into curves and reverse curves up to 360 degrees. Parts can be formed in several planes and cross sections, and tapers are as easy as flat pieces. A standard machine will handle parts as large as 9 x 33 ft.

Radial draw formers can use relatively inexpensive dies, too. Wood, plastic and nonferrous metals are as practical as conventional die steels.

First — The aircraft industry took its first good look at radial draw forming at the start of the Korean War. Today, the method is gaining wider acceptance with metal-formers.

It looks like Detroit will see a lot more of them in the near future.



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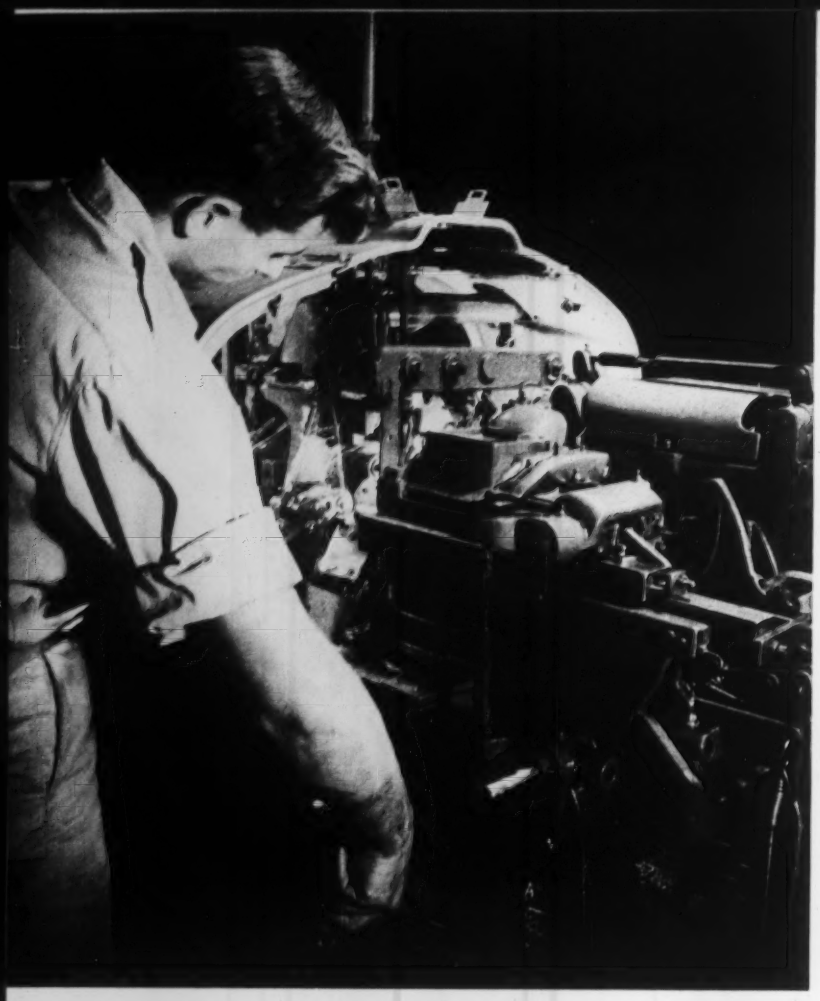

Here are recommended speeds, feeds and cutting tool design for getting the most out of aluminum stock on your automatic screw machines

Machining Aluminum on the Automatics

IN THE LAST decade, aluminum has gained a place on the list of standard screw machine materials. It offers advantages in weight and cost, but one of its strongest points is machinability.

The metal can be cut easily. Tolerances and surface finishes can be superior when the machines are properly tooled. Here are checkpoints for troublefree cutting.

Ground Rules

Most screw machine work with aluminum can be done satisfactorily with 2011-T3, 2017-T4, 2024-T4 stock. Among the strongest aluminum alloys, they are suitable for any type work except where special forming is necessary, or where it is desirable to maximize electrical conductivity or corrosion resistance.

Although these alloys all are considered screw machine material, 2011-T3 is the superior one from a machining standpoint. Alloy selection should always start with an evaluation of it.

Considerations — Aluminum alloys have a greater thermal expansion than some other metals. When gaging screw machine work, attention should be given to the proper temperature of the metal so no contraction will take place later, making the part smaller than gaged.

Tools such as taps and reamers should be made to the high side of the tolerance range. The allowance is particularly necessary on large pieces from which a considerable amount of metal is removed rapidly.

Support—Aluminum has a relatively low modulus of elasticity and will deflect more than other metals under the same load without taking a permanent set. In operations that exert considerable side pressure on the material, it may be necessary to support the

Selecting Aluminum Alloys for Screw Machining

Alloy	Machinability[1]	Tensile Strength (psi)	Corrosion Resistance[2]
1100-H14	C	18,000	A
2011-T3	A+	55,000	D
2011-T8	A+	59,000	C
2017-T4	A	62,000	C*
2024-T4	A	68,000	C*
3003-H14	C	22,000	A
5052-H14	C	39,000	A
6061-T6	B	45,000	A
6063-T5	B	27,000	A

1. Ratings based on automatic screw machines only. Ratings apply to aluminum alloys only, not to be used to compare with other metals. A is excellent, B, good, C, fair.

2. An A rating is highest.

*In larger sizes, these alloys will have a somewhat lower rating.

stock to prevent deflection. It is always desirable to work as close as possible to the collet and thus maintain a rigid setup.

Aluminum alloys should be cut at fairly high feeds. Rubbing of the tools against the stock surface should be minimized. It is best to have the tools cut through the stock surface quickly and to use as high a feed as is consistent with the finish and the tolerances to be maintained. This is particularly true with form tools.

Alloys—Free machining 2011-T3 was designed for good machinability. Chips break up readily, tool wear is relatively low and higher feeds can be used than with the other aluminum alloys. An excellent machine finish and close tolerances can be maintained. A variety of tool angles are permissible with 2011-T3, but to obtain the best chip breakage, keep rake angles fairly low. On some deep drilling jobs, 2011-T8 (another temper of 2011) will give better results.

The alloys 2017-T4 and 2024-T4 can be machined to excellent finishes, but most chips are continuous, although they do have a tendency to curl. It may be necessary to grind chip breakers to maintain satisfactory chip conditions. Rake angles are usually larger than those for 2011-T3.

Alloys 6053-T6 and 6061-T6 offer less resistance to penetration of the tool than 2017-T4 or 2024-T4, but the chips are gummier and have a tendency to build up on the tool. Tools require larger rake angles.

The chips from 3003 are tough and difficult to curl. It may be necessary to reduce the cross sectional area of the chip. The alloy 5052 forms a gummy chip and machine finishes may not be quite as good as those of 3003, but production rates may be higher. Tools with large rake angles are required for satisfactory results.

Tool Materials

Relatively high speeds are used. Although the red-hardness characteristic of high-speed steels probably is not utilized to the fullest extent, their high abrasive resistance makes them a first choice for most tools which machine aluminum in automatic screw machines.

High-Speed Steel — Tool steels 18-4-1 and 18-4-2 are used with success in many applications. Although 18-4-2 steels are more brittle than 18-4-1, they have higher resistance to abrasion. Balanced molybdenum steels generally give as good results as 18-4-1, but care must be exercised in their use to avoid burning during grinding. Cobalt steels are good for tool bits. In general, hardness for high-speed steel tools should be 62 to 66 Rockwell C.

Carbon Steel—With some small, fragile tools—such as drills and taps—tool breakage is more critical than tool wear. Tough carbon steel is desirable for such tools since their surface speed is low.

Cemented Carbide — Cemented carbide tools offer long tool life, in some cases over 30 times the life of high speed tools between grinds. They permit higher speeds, but sometimes machines cannot use this property to greatest advantage. The tip must be used where it can be given adequate support and where the toolholder and machine slide are rigid. Carbide-tipped tools are advantageous generally for simpler form tools, turning tool blades, large counterbores, V-rests for box tools and similar applications.

Cutting Tools

Box Tools—These may be used on aluminum alloys to remove large quantities of metal in one cut and maintain an excellent finish and reasonably close tolerances at the same time.

Box tools may be used without a chipbreaker for turning 2011-T3. When machining other alloys, a chipbreaker should be ground in the tool to provide freer cutting and to coil the chips and guide them away from the tool and the work. A V-shaped breaker is best, with the point of the V at the bottom corner of the tool, ground almost to the cutting edge.

Aluminum may be turned at high surface speeds with box tools. For high-speed steel blades, rule-of-thumb speeds are: Round stock, 700 sfpm; hexagon stock, 450 sfpm; square stock, 300 sfpm.

Counterbores—Most counterboring operations require special tools. Design depends upon the job. No set rules can be given for the choice of the right tool.

To provide free cutting, counterbores should be designed with a positive rake. In general, tools that drill into solid stock should have flutes milled at a 23-degree spiral angle, similar to a standard twist drill. If the depth of the counterbored hole is not too great and the diameter is under 1 in., the flutes may be milled straight at an angle of 7 to 10 degrees to the longitudinal axis of the tool and at 5 degrees to the radius.

Two-flute counterbores will remove large quantities of metal. Generally, they'll give good results for diameters under 1 in. Where feed is high, a light cut is taken and a good finish is required, four-flute counterbores are usually employed if the diameter is more than 1 in.

High-speed steel counterbores

Recommended Surface Speeds

Tool	Speed (sfpm)
All except drills and threading tools	700 (round stock) 450 (hexagon stock) 300 (square stock)
Drills	600 (less than 1 in.) 550 (1 to 1½-in.) 450 (over 1½-in.)
Taps	200 (24 pitch and finer) 150 (18 to 24 pitch) 125 (12 to 18 pitch) 100 (8 to 12 pitch)
External Threading	475 (18 pitch and finer) 325 (14 to 18 pitch) 250 (9 to 14 pitch) 200 (9 pitch and coarser)

Source: Aluminum Co. of America.

may be operated up to 700 sfpm. Feeds depend on the size of the tool, the depth of the cut, number of flutes and the desired finish and tolerance. Generally, when counterboring straight holes of varied diameters in solid stock, the counterbore may be operated at the same feed as a drill of similar size. If the tool is being used as a facing tool (large steps or flat-bottom hole), use feeds about half those employed on a drill of the same size. If steps are extremely wide, feeds as low as 0.002 to 0.005 in. per revolution may be necessary. Where the main function of the counterbore is reaming, and only a light cut is taken, higher feeds such as used for reamers will work. Taper counterbores usually are operated at half the feed of a drill of the same size.

Cutoff Tools—For most applications, a front angle of 22 to 23 degrees will give good results with a minimum cutoff burr. On straight cutoff tools making deep cuts at heavy feeds, the front angle may have to be reduced to 8 to 15 degrees.

On circular cutoff tools, front clearance is obtained by setting the center line of the tool ahead of the center line of the stock. These tools should be provided with a ½-degree side clearance to reduce rubbing. Straight cutoff blades should be ground with 8 to 12 degree front clearance.

Circular cutoff tools ground with a top rake of 0 to 3 degrees will tend to break 2011-T3 chips. For other aluminum alloys, a rake angle of 5 to 10 degrees is normally used. This also is good practice for cutoff tools that form the stock or the piece, as, for example, form tools. Rake angles of straight cutoff tools are set by the toolholder and are usually from 5 to 15 degrees.

It may be advisable to grind a chip breaker behind the cutting edge. Use a speed of 700 sfpm for round.

Generally, a surface speed of 450 sfpm is used for hexagonal stock and 300 sfpm for square stock. The feed depends on: 1. The shape and width of the tool. 2. Whether the contour of the cutoff surface must be blended with other surfaces. 3. The finish and tolerances required on the cutoff surface. 4. The depth of cut.

Drills — On some deep drilling jobs, 2011-T8 will give better results than 2011-T3.

Standard-twist drills are generally used for drilling holes up to six diameters deep. With deeper holes, straight-flute or high-spiral drills work best because of their superior chip clearance.

When drilling aluminum alloys you can reduce the margins on standard drills. The narrower margin lowers the friction between the drill and the hole, reducing the heat generated.

In general, if holes are not too deep, a standard included cutting-lip angle of 118 degrees will give satisfactory performance. The clearance angle behind the cutting edges should be 12 to 20 degrees.

Carbon-steel drills may be operated at peripheral speeds up to 80 sfpm. The smaller diameter high-speed steel drills may be operated up to 600 peripheral feet per minute. Where large quantities of metal are removed, low feeds may be necessary to hold down power requirements.

Drills, when properly ground and set, will cut aluminum alloys to size, or not more than 0.002-in. over size. However, any condition that causes overheating tends to decrease the size of the holes. Deep holes and high feeds will tend to decrease hole size in relation to the drill size.

Facing Tools—These tools should be held rigidly to prevent chattering, especially on wide cuts. The front clearance of facing tools cutting on a radius of the stock is set by the holder and is usually 8 to 12 degrees. The tools should be ground with a top rake angle of 10 to 15 degrees.

They may be operated at the same speeds as other tools in the setup, up to 700 sfpm for high-speed steel. On wider cuts, where a flat surface and a good finish are required, feeds from 0.001 to 0.003 in. per revolution will give best results. For light facing operations, higher feeds may be used.

Form Tools—The front clearance angle on form tools is set by the holder in the machine. Circular tools are set with the center line of the tool ahead of the center line of the stock, providing clearance below the cutting edge. The clearance on dovetail tools is usually 10 to 15 degrees. Tools which form a shoulder should be provided with side clearance, especially if the shoulder is deep. If it is permissible for the shoulder to taper, the tool should be designed with a negative clearance angle so it cuts along this edge.

The rake angle for machining 2011-T3 alloy should be between 0 and 3 degrees for best chip breakage. When machining other aluminum alloys, use more rake to provide freer cutting. Where large quantities of metal are removed in a roughing operation or when soft-

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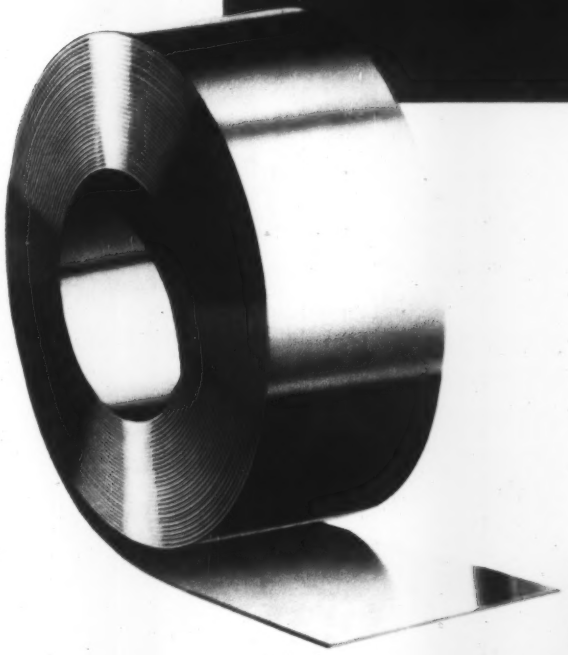

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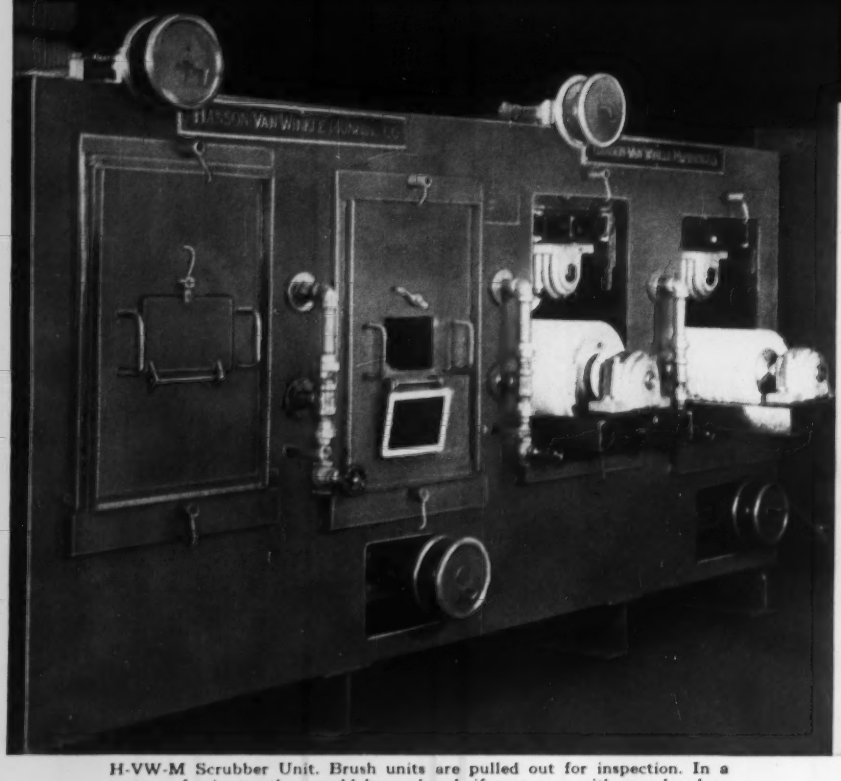

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er or gummier alloys are machined, such as 1100 and 6053, larger rake angles may be advantageous. This additional rake is usually obtained by grinding a chip breaker behind the cutting edge.

When machining aluminum alloys other than 2011-T3, you may want to break or coil the chips to prevent them from interfering with operations. You can use small grooves which are ground into the top face of the tool just behind the cutting edge. On tools flat across the front, a step may be ground into the cutting edge.

Owing to the increased cutting force of wider form cuts, there is a limitation to the length that can be formed unsupported, without breaking the stock. This limit, expressed as the ratio of the length to the smallest form diameter, is about 2.25 for 2011-T3 and 6053-T6, and 2.50 for 2017-T4 and 2024-T4. Where a support is used, the length that can be formed and the distance to which forming can be carried are limited to four or five times the smallest diameter.

High-speed steel form tools may be operated up to 700 sfpm when round stock is machined. Speeds of 450 and 300 sfpm are generally used for machining hexagonal and square stock.

Knee Tools — Clearance angles are generally between 10 and 15 degrees. A rake angle of 15 to 20 is used normally. For 2011-T3, less rake may be needed to break up the chips. A small radius on the point of the tool, similar to that on a lathe tool, may improve tool life and the finish produced.

Speeds can be 700 sfpm for round, and 450 and 300 sfpm for hexagon and square stock. Generally, for cuts from 1/32 to ¼-in. deep, feeds from 0.020 to 0.008 in. per revolution are used.

When chips cause trouble, grind a groove in the cutting face behind the cutting edge. Leave a small land between the groove and the cutting edge.

Knurls — Aluminum may be knurled in automatic screw machines with most standard knurling tools. Owing to the high surface speeds used in machining this material, it is generally advisable to use large diameter knurls to reduce their bearing speed and to prevent excessive wear.

Reamers—Reamers should have large flutes to pass the chips readily, and there should be a sufficient number of flutes so that the tool has adequate support. Feeds and the depth of cut must be chosen so the reamer has a cutting rather than a rubbing action on the metal.

On straight holes, straight flute and spiral reamers work well. On some jobs where close tolerances are not required, you can use standard twist drills as reamers, especially in the smaller sizes. For finishing tapered holes, reamers with flutes spiraling opposite to the direction of cutting are generally used.

Recess Tools—Recess tools are inherently weak. They should be designed as large and sturdy as is consistent with the size of the hole, the needed chip room and movements of the tool.

A clearance of 5 to 10 degrees should be provided between the periphery of the tool and the work. It may be obtained by offsetting the radius of the tool from the center line. The radius of the tool may be the same as that of the hole or as much as 0.008 in. less. Recess tools which face a flat shoulder—and those in which the recess must be blended with another surface—should be provided with a ½-degree side clearance. A larger side clearance will be necessary if the tool is fed endwise as in boring operations. For most general work, the tool should be ground with a 0 to 5 degree positive rake. If a lot of metal is to be removed and the tool is large and rigid, you can use larger rake angles.

Recess tools may be operated at the same speeds and end-working feeds as other tools in the setup. On other jobs, use a radial feed of 0.0005 to 0.002 in. per revolution. For boring operations, an endwise feed of 0.001 to 0.005 in. per revolution should be used.

Shaving Tools—Usually ground with a cutting angle of 85 degrees, shaving tools may be operated up to 700 sfpm. Feeds are regulated by the length of the cut and the diameter of the finished piece. Feeds of 0.005 to 0.0015 in. per revolution have proved satisfactory. Shaving tools can remove as much as 0.015 in. from the diameter, but 0.005 to 0.010 in. is preferable.

The tolerance then can be held by shaving tools depends upon the width of the cut and the part di-

Recommended Feeds

	Feed (inches per revolution)	
BOX TOOLS	Alloy 2011	Other Alloys
(Depth of Cut)	(Diameter)	(Diameter)
1/32-in.	0.015 (1/4-in.)	0.012 (1/4-in.)
	0.012 (1/4 to 1/8-in.)	0.010 (1/8 to 1/4-in.)
	0.008 (1/16 to 1/8-in.)	0.007 (1/16 to 1/8-in.)
1/16-in.	0.0125 (over 1/4-in.)	0.010 (over 1/4-in.)
	0.010 (1/8 to 1/4-in.)	0.009 (1/8 to 1/4-in.)
	0.007 (1/16 to 1/8-in.)	0.006 (1/16 to 1/8-in.)
1/8-in.	0.010 (over 1/4-in.)	0.008 (over 1/4-in.)
	0.009 (1/8 to 1/4-in.)	0.007 (1/8 to 1/4-in.)
3/16-in.	0.009 (over 1/4-in.)	0.007 (1/8 to 1/4-in.)
1/4-in.	0.008 (over 1/4-in.)	0.006 (over 1/4-in.)
CUTOFF TOOLS		
(Width)		
3/64 to 1/16-in.	0.0035	0.003
3/32 to 1/8-in.	0.004	0.0035
5/32 to 1/4-in.	0.0045	0.004
DRILLS		
(Diameter)		
1/16-in.	0.004	0.004
1/8-in.	0.012	0.010
1/4-in.	0.017	0.014
over 1/4-in.	0.020	0.017
FORM TOOLS		
(Width)		
1/8 to 1/4-in.	0.0035	0.003
3/8 to 1/2-in.	0.003	0.0025
5/8 to 3/4-in.	0.0025	0.002
1-in.	0.0015 to 0.002	0.0015

Source: Aluminum Co. of America.

Suggested Tool Materials

TOOL	CARBON STEEL	HIGH-SPEED STEEL	CEMENTED CARBIDE
Box tool blades		General use	Exceptional finish; high rate of metal removal; high production
Box tool V-rests	General use		Exceptional finish; high speeds, heavy pressures, high production
Box tool roller rests	General use		
Counterbores		General use	Large counterbores, high speeds, close tolerance, exceptional finish
Cutoff Tools		General use	
Drills	Where breakage is a factor, less than 80 sfpm or 0.140 in. diam.	General use	
Facing tools		General use	High production, exceptional finish
Form tools		General use	Roughing cuts, high production with close tolerances, fine finishes
Knee tools		General use	Rapid rate of metal removal, high production
Knurls	General use		
Knurl bushings		General use	
Knurl pins		General use	Heavy pressure, high speeds, high production. *Note:* It's better to use larger diameter, cemented carbide pin than high-speed steel
Knurl roller bearings		High speeds, heavy pressure. General use	
Reamers		General use	
Recess tools		General use	
Skive tools		General use	
Shaving tools		General use	
Shaving tool rollers	General use		
Supports	General use		Large diameter for high speeds and heavy pressures
Taps and collapsing tap chasers	Small sizes where breakage is a factor	General use	
Threading dies and chasers		General use	

Source: Aluminum Co. of America

ameter. For most work, a total tolerance of 0.0015 in. is acceptable, but in some special cases, particularly on small diameters, 0.0005 in. or less has been achieved with careful setup.

Skive Tools—The light rubbing action of the work against the tool produces a bright finish on aluminum.

For most work, an approach angle of 30 to 35 degrees is used. On larger diameters, where the increased cutting force of the tool cannot bend the stock, you might use smaller approach angles to advantage.

Because of the nature of these tools, small cutting angles may be used without weakening the cutting edge. For machining 2011-T3, a cutting angle of 70 degrees generally is best, and for 2017-T4, an angle of 54 to 70 degrees will prove out. Softer alloys may require smaller cutting angles.

For almost all skiving operations, the stock should be supported. On some jobs, it might be wise to support the stock for its entire length.

When springing or stock breakage is not a factor, skive tools with 35-degree approach angle may be used at advances of about 0.010 in. per revolution, depending upon the depth of cut and shape of the part. Small approach angles, deep cuts and position of support all may drive you to lower feeds.

External Threading—Threading dies and chasers should be made from high-speed steel, heat treated to 61-65 Rockwell C. Hooking the face of the tool to give a rake of 20 to 25 degrees will produce good threads on 2011-T3, 2017-T4 and 2024-T4.

Too little clearance behind the cutting edge will cause rubbing, pickup of metal and rough threads. Excessive clearance may cause chatter, poor threads at the start or taper threads.

Aluminum may be threaded at high speeds, limited only by the available power, strength of the tool, the machine's ability to hold a given length, and by the pitch of the thread.

Tapping—Standard taps are commonly used for tapping aluminum on automatic screw machines, but special taps will often give better results. Most tapped holes don't have much chip room at the bottom. You must make provisions to get the chips up the flutes. Three considerations govern the choice of the tap: Land width, number of flutes and tap strength.

The land width depends on the pitch of the thread. The land should be just wide enough to support the tap. Lands too wide make for hard cutting. Figure width at 1½ to 3 times the thread pitch.

You need enough flute capacity to get rid of the chips easily, yet land area must be sufficient to support the tool. Flute depth should be about one-half the width.

Enough metal must be left in the tap so that it isn't weakened. It must transmit the torque required for cutting.

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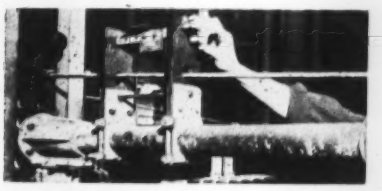
Automatic Finishing

System lets you dial a finishing cycle in either a plating or anodizing line

A NEW by-pass mechanism automatically controls as many as nine or more metal finishing processes on a single anodizing or electroplating machine.

The mechanism is a part of the "Dial-A-Cycle" system made by Hanson-Van Winkle-Munning Co., Matawan, N. J. A dial on the carrier arm that moves parts through processing tanks controls the operation. Unfinished parts are loaded on the carrier and the machine operator sets the dial for the processing steps through which the load is to move. Automatic conveying does the rest, lowering parts into the prescribed tanks, by-passing others, according to the dial setting.

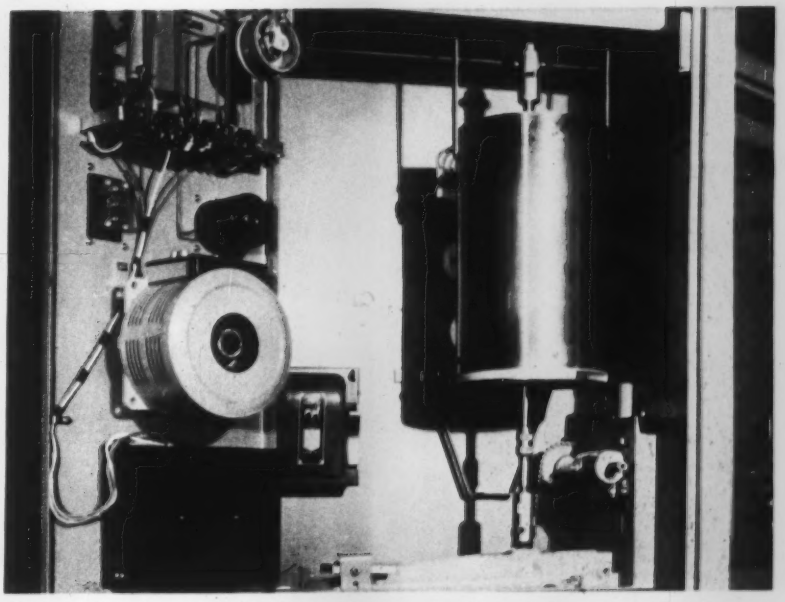


DIAL MECHANISM
. . . to select process cycle

Heart—A series of limit switches and solenoid-operated setdown flippers control the action of the carrier. Different dial settings change the position of a "flag" which contacts or passes switches and flippers at each tank in the metal finishing sequence.

The first installation is at a refrigerator plant where 15 different aluminum parts are automatically anodized. A four-process system is built into the anodizing machine. This permits the company to get two different anodizing treatments and two types of seal.

Benefits — Advantages cited by initial users include: 1. Cost reduction, since a Dial-A-Cycle system on one machine can do the same metal finishing job formerly done by as many as nine machines. 2. Reduction of labor costs. 3. Improved quality, due to close, automatic costs.



The cylinder (upper right) is the furnace in this creep tester. Specimen is shown mounted. Screw jack is beneath the furnace. Jack and levers apply a steady pull; readjustments for creep are automatic

Creep Tester Is Redesigned

In the search for newer metals which withstand higher temperatures, metallurgists need creep testers. This one is said to be better because specimens get a straight pull with no twist

THE device shown in the picture above is a creep tester. This improved model applies a straight axial load to a metal specimen with no twisting. It simplifies the technician's job by eliminating torque computations.

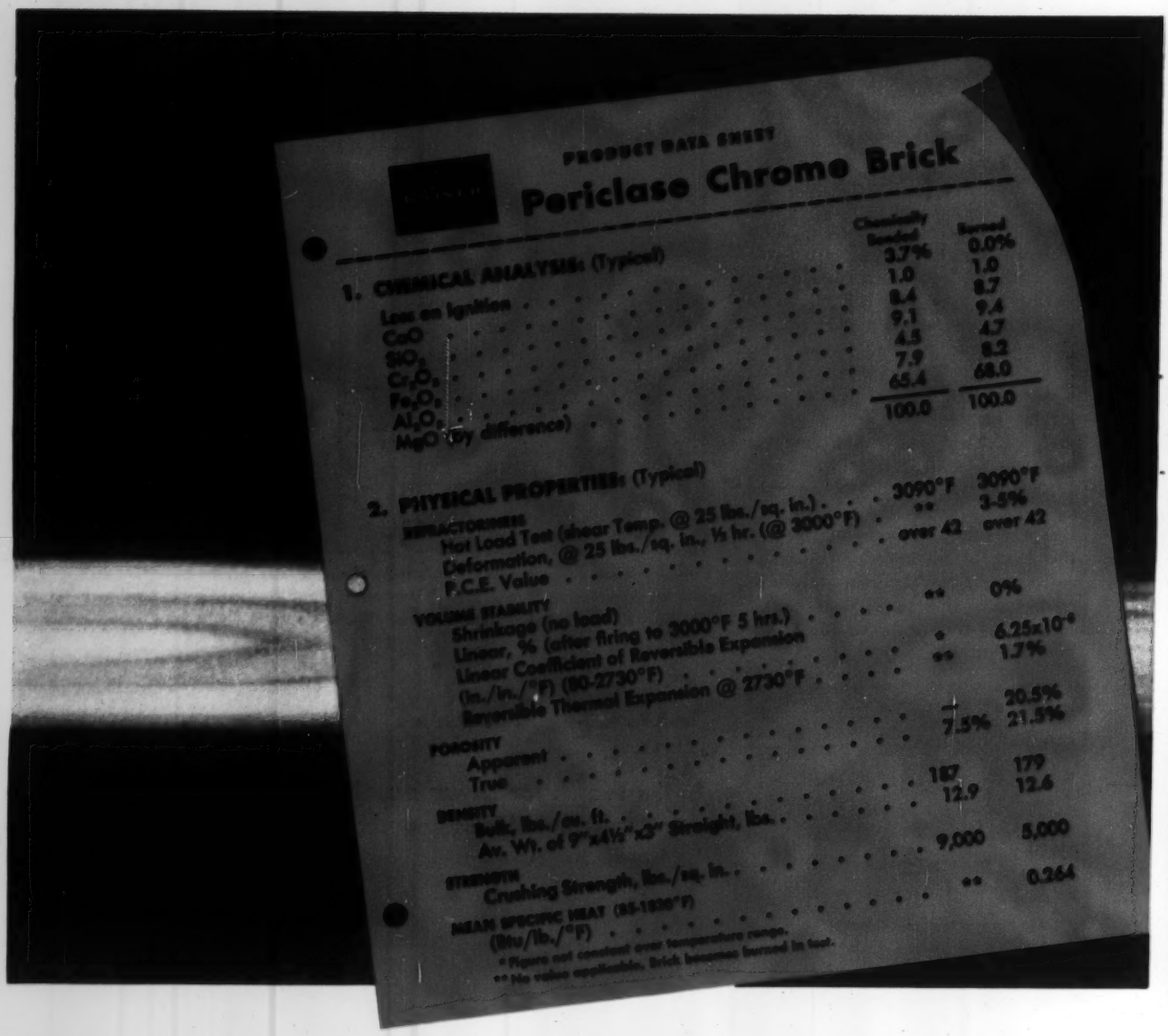
Jets and Atoms—A creep tester simulates high temperature working conditions, like those found in jet engines and atomic reactors. The one shown, made by Arcweld Mfg. Co., Grove City, Pa., heats metal specimens to 2200°F and applies 20,000 lb of stress. Results tell how well the metal works at high temperatures.

The loading system of a creep tester must apply a straight load, and it must move with the specimen to maintain uniform tension. Arcweld uses a system of levers and a worm gear jack.

The specimen is attached to the clamps above and below the cylindrical furnace. The metal is heated and the load applied. During yield or creep, the loaded arm which holds the specimen moves downward. The movement is picked up by an electronic device which operates the worm gear jack, compensating for the change. Movement of only 0.00025 in. will activate the jack.

Old Story—With more emphasis being placed on tougher alloys, Walter J. O'Connor, founder of Arcweld, saw a need for a better testing machine. Noting torsional strain as a drawback, he traced it to a slight radial movement in the loading mechanism. There also was a decrease in pressure ratio as the metal crept because the pulling force was being spread through a longer area.

The answer was to apply the force to the loading arm fulcrum. That, in turn, called for some method of applying force smoothly and without sudden shock. Arcweld uses a Duff-Norton worm gear jack.


PRODUCT DATA SHEET
Periclase Chrome Brick
1. CHEMICAL ANALYSIS: (Typical)
Chemically Bonded
Burned
Loss on Ignition 3.7% 0.0%
CaO 1.0 1.0
SiO2 8.4 8.7
Cr2O3 9.1 9.4
Fe2O3 4.5 4.7
Al2O3 7.9 8.2
MgO (by difference) 65.4 68.0
100.0 100.0
2. PHYSICAL PROPERTIES: (Typical)
REFRACTORINESS
Hot Load Test (shear Temp. @ 25 lbs./sq. in.) 3090°F 3090°F
Deformation, @ 25 lbs./sq. in., ½ hr. (@ 3000°F) ** 3-5%
P.C.E. Value over 42 over 42
VOLUME STABILITY
Shrinkage (no load) ** 0%
Linear, % (after firing to 3000°F 5 hrs.)
Linear Coefficient of Reversible Expansion * 6.25x10-6
(in./in./°F) (80-2730°F) ** 1.7%
Reversible Thermal Expansion @ 2730°F 20.5%
POROSITY
Apparent 7.5% 21.5%
True
DENSITY
Bulk, lbs./cu. ft. 187 179
Av. Wt. of 9"x4½"x3" Straight, lbs. 12.9 12.6
STRENGTH
Crushing Strength, lbs./sq. in. 9,000 5,000
MEAN SPECIFIC HEAT (80-1920°F)
(Btu/lb./°F) ** 0.264
* Figure not constant over temperature range.
** No value applicable. Brick becomes fused in test.

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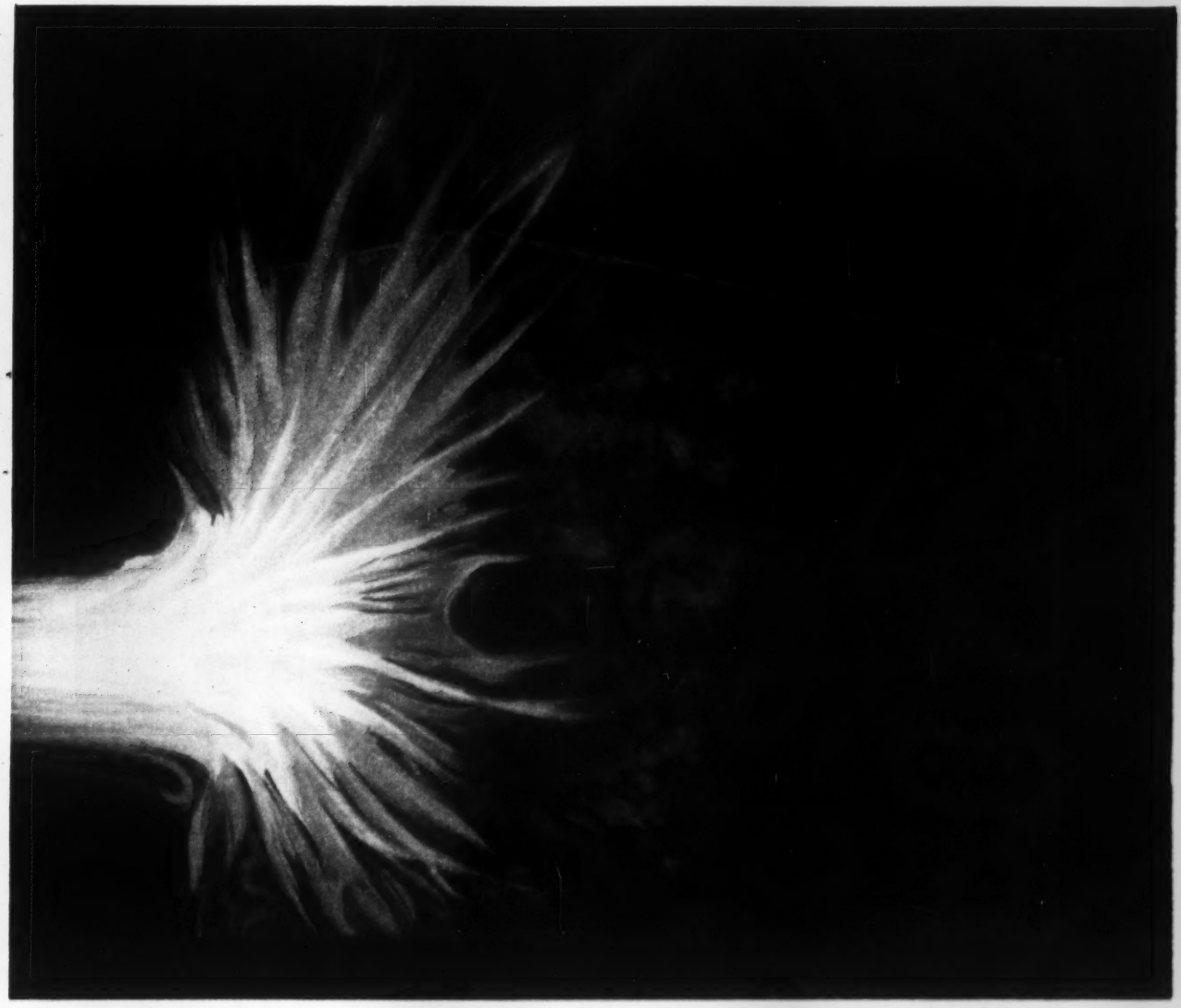

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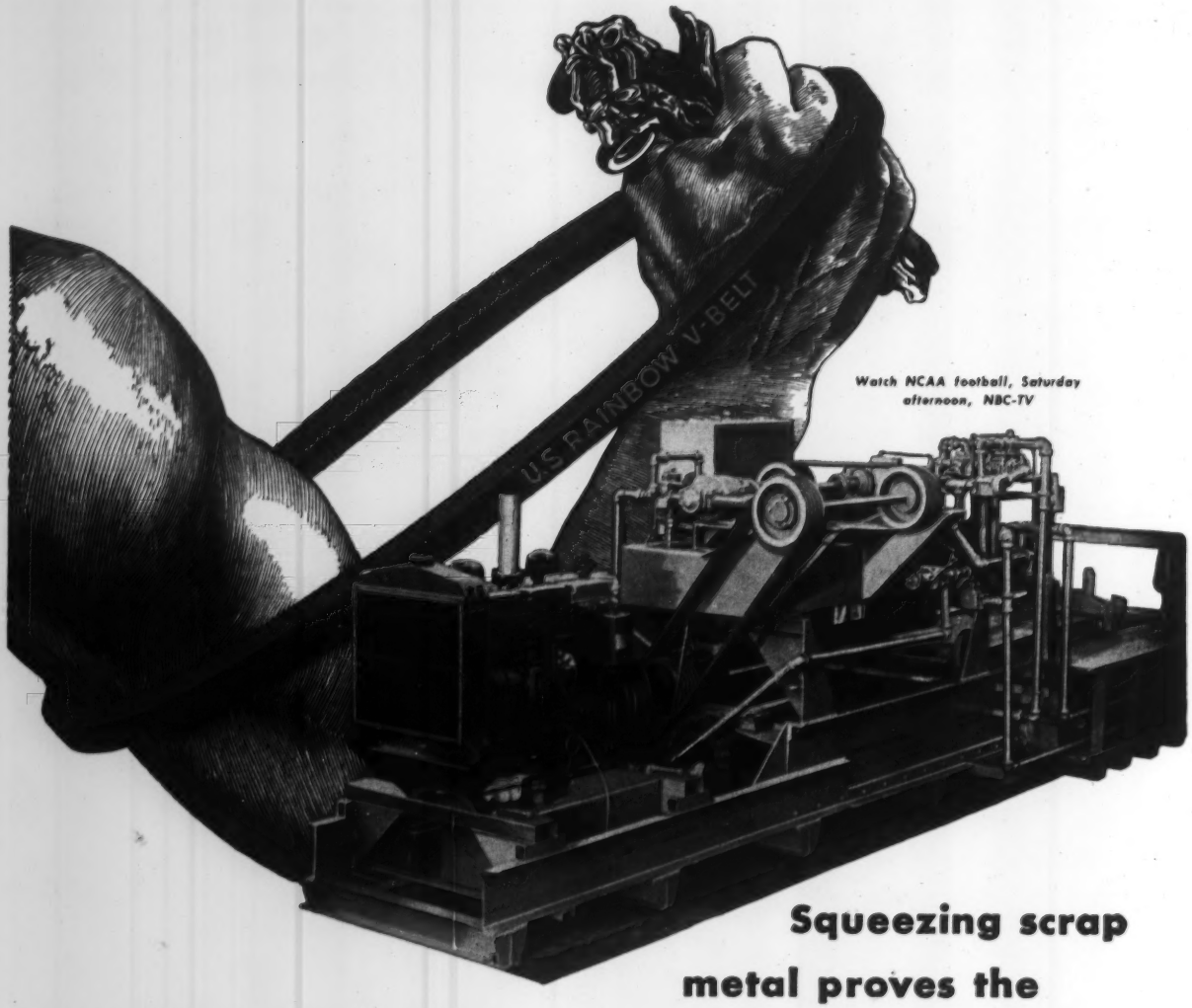

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Squeezing scrap metal proves the "MUSCLE TOUGHNESS" OF U. S. RAINBOW V-BELTS

Many scrap metal dealers use the Dempster-Balester to bale sheet metal into easy-to-handle units. The tremendous power of the machine puts terrific shock loads on V-Belts —U. S. Rainbow® V-Belts. These muscular belts stand up under this treatment because they each have the unique Equa-Tensil Cord Section, a scientifically developed "U. S." construction that brings together in a balanced unit the concentrated strength of multiple pulling cords, distributes the load so evenly among the cords that each carries its full share of the load.

U. S. Rainbow V-Belts have greater gripping power, without slippage, because the straight sidewalls grip the grooves the full height of the belt. Every ounce of excess stretch is worked out mechanically before leaving the factory, yet the belt remains elastic enough to stand heavy shock loads.

U. S. Rainbow V-Belts are obtainable through any of our selected distributors, or any of United States Rubber Company's 28 District Sales Offices, or write us at Rockefeller Center, New York 20, N. Y.

A COMPLETE DRIVE SERVICE

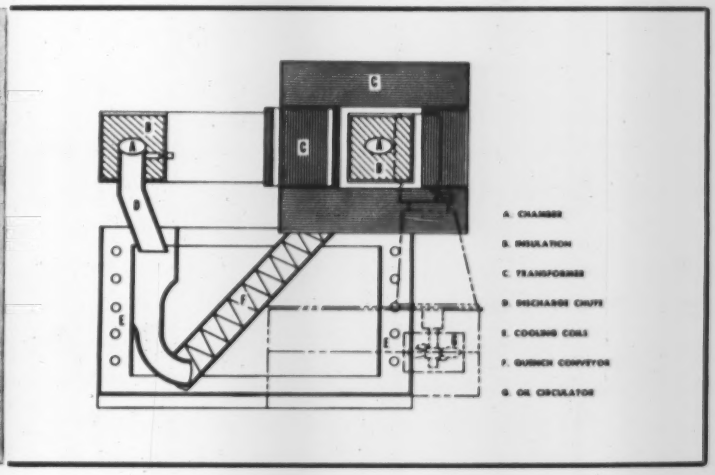
MULTIPLE V-BELTS • F. H. P. V-BELTS • SHEAVES

FLAT BELTS AND BELTING • *POWERGRIP* "TIMING"® BELTS • SPECIAL PURPOSE BELTS

Mechanical Goods Division

United States Rubber

Heat Treating Furnace Uses Induction Heating



The Induct-O-Ring is for carbonitriding, bright hardening and carburizing of small parts.

Cold parts can be brought to hardening temperatures in 17 minutes.

All the heat is in the work chamber and workload. A heat-resistant alloy liner deeply embedded in insulation holds in the heat.

Temperature control is precise because there is practically no temperature override or lag when the control point is reached and power goes off and on.

Circular design eliminates the heat and atmosphere losses other furnaces incur when their doors are opened to charge and remove loads.

The design also saves floor space. By using a double turn on the retort, it is possible to have 30 ft of furnace length in a space 5 ft in diameter. Increasing the number of turns increases chamber lengths.

Operation is automatic and simple. The furnace turns slowly in the direction of work travel, then quickly reverses. With each turn, the work remains in the forward position; as a result, it progresses regularly through the chamber until it reaches a discharge chute.

A quench tank, quench conveyor and cooling coils are enclosed in the base of the unit. The oil circulator is attached.

The control panel is completely wired, and only air and power connections are needed. The use of induction heating eliminates heating elements, element terminals, burners and gas or electric connections in the furnace proper.

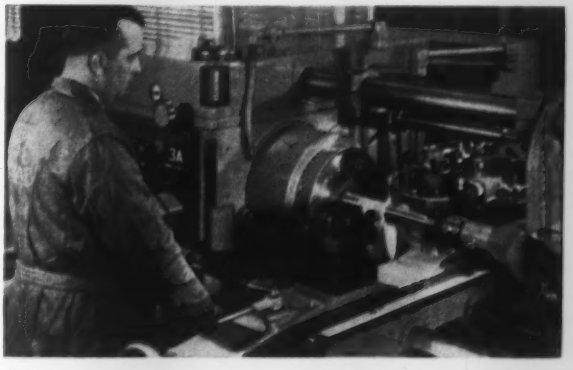
Precise heat control, negligible maintenance and dependable operation make the furnace adaptable to automation. *Write*: Lindberg Engineering Co., 2450 W. Hubbard St., Chicago 12, Ill. *Phone*: Monroe 6-3443

Contour Tracing Attachment Does Turning and Facing

Complex tapers, contours and stepped diameters which increase in the direction of trace, up to and including 90 degree shoulders, can be cut on 3A and 4A turret lathes with this hydraulic attachment.

Successive roughing, semifinish and finish cuts can be controlled precisely from a single flat or round template used as the master pattern. As many as six successive template-controlled passes can be made without any need for the operator to adjust the cutting tools.

A holder positions the facing template at 90 degrees to speed conversion from contour turning to facing. *Write*: Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O. *Phone*: Henderson 1-5580



NEW PRODUCTS and equipment

Torque Wrench Calibrator

All types of hand torque wrenches can be set and checked with this bench mounted calibrator.

No piping, wiring or external connections are needed. Calibrations are accurate within 1 per cent of the full scale reading. Both right and left-hand torque wrenches of the flash, snap or dial type may be inspected.

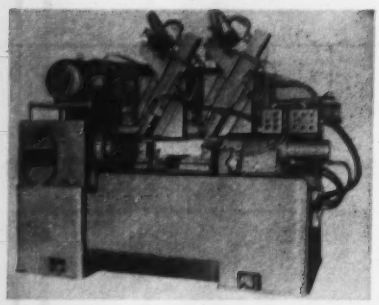
Models are available for checking torques from a few inch-pounds to 2000 ft-lb. *Write*: Skidmore-Wilhelm Mfg. Co., 442 Green Rd., Cleveland 21, O. *Phone*: Ivanhoe 1-4774

Double Tracer Lathe

Parts like axleshafts, motorshafts and camshafts can be handled in a single setup.

The top arrangement makes it possible to mount tracers in a variety of ways. Possible combinations: 1. Either right or left-hand mounting of tracers or a combination of both. 2. Tracers mounted in tandem with a single hydraulic feed cylinder. 3. Individual feed cylinders for each tracer.

Machining cycles are automatic



and can be preselected for the operation. *Write*: Hydra-Feed Machine Tool Co., 730 W. Eight Mile Rd., Ferndale, Mich. *Phone*: Lincoln 6-2828

Nylon Parts

Nylasint 64 is a formulation of finely divided nylon powders used for making mechanical components by cold pressing and oil sintering.

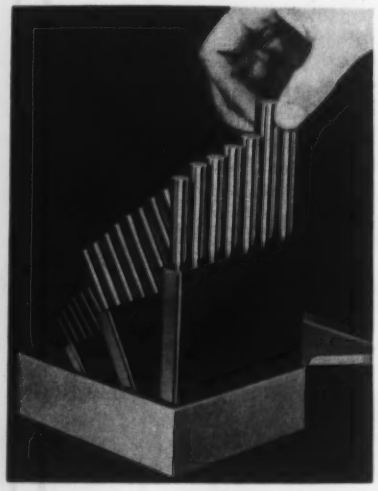
Parts have high wear resistance, low surface friction and low hydroscopic and thermal expansion.

Various inert fillers, such as molybdenum disulphide, graphite, etc., provide specific properties. *Write*: National Polymer Products Inc., Reading, Pa. *Phone*: 6-7241

Drill Blanks

These hardened high speed drill blanks come in 182 standard stock sizes. They can be used as knockout pins, punches, dowel pins, gages and rollers for high temperature applications.

On the job, the blanks are quickly adaptable to form end-cutting tools, such as routers, counter-



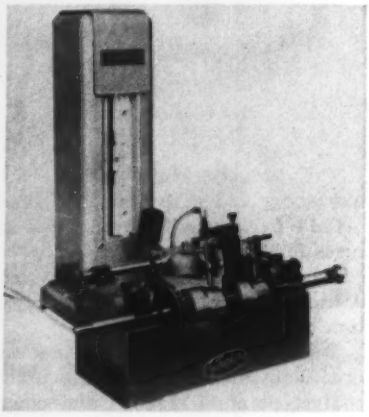
sinks, spot facers and end mills.

Blanks up to ½-in. in diameter are of standard drill lengths with a tolerance of +0.0002 in., −0.0000 in. Blanks over ½-in. through 1 in. in diameter are furnished in standard 6-in. lengths with a tolerance of +0.0005 in., −0.0000 in.

Standard sets of fractional, letter and wire sizes are available. *Write*: Ace Drill Corp., Adrian, Mich.

Cam Inspector

The 3 D Comparitor checks against a master. Readings on two and three dimensional cams are accurate to ±0.0002 in. On highest precision work, measurements of ±0.0001 in. are possible.



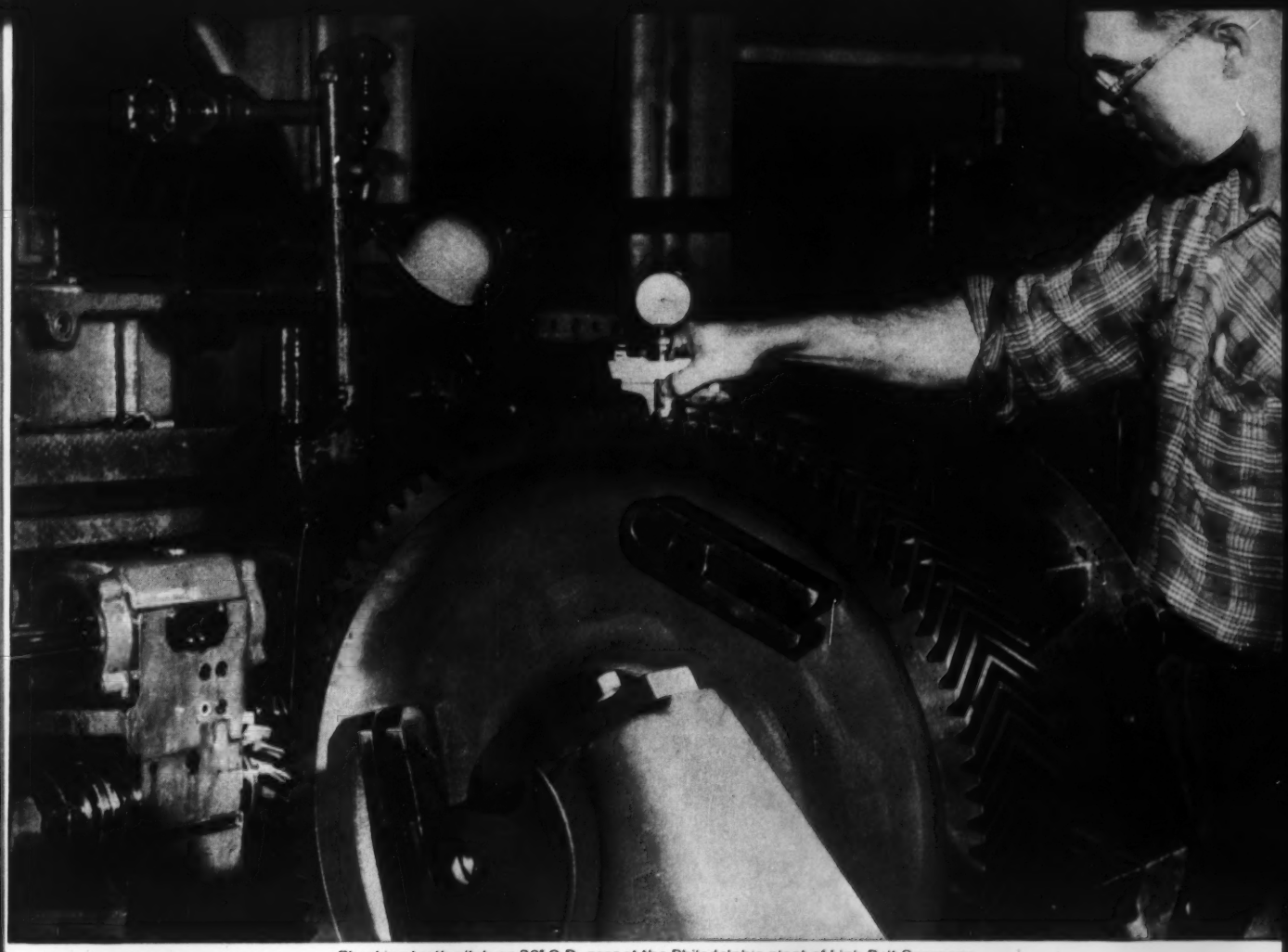
This device gives true readings on an infinite number of specified points. In a day, 50 to 60 cams can be inspected. One intricate three dimensional cam with 4000 stations is inspected in less than 4 minutes.

A ball probe, exactly the size of the follower that will be used, traces the contour of the work. The master and the duplicate cam are installed on a single arbor. Any discrepancy in dimensions is indicated on an air gage. *Write*: Parker Stamp Works Inc., 650 Franklin Ave., Hartford, Conn. *Phone*: Chapel 6-1651

Polishing Lathe

This high speed machine (model 5-ROL) has a shortened spindle for hand finishing small automotive and aircraft parts.

Speeds go up to 6500 rpm. A combination brake and switch is operated by a single lever. The



Checking teeth pitch on 32" O.D. gear at the Philadelphia plant of Link-Belt Company.

speed up machining, extend cutter life with Standard Steel forged gear blanks

By switching to Standard Steel forged blanks for the helical and herringbone gears used in their enclosed drive units, the Philadelphia plant of Link-Belt Company has speeded up machining time and lengthened cutter life substantially. That's because:

- Dimensional tolerances are closer, so all gear blanks of the same size can be machined on a single setup.
- Standard Steel forged blanks have no blow holes, porosity or non-metallic inclusions, so finish turning, facing, boring and hobbing can be done faster.
- High speed cutters last much longer because these forgings have a more uniform internal structure.

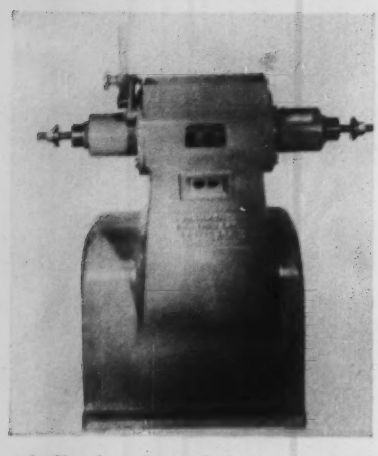
Link-Belt's experience in reducing costs is typical of hundreds of other manufacturers. When you specify Standard Steel forgings, you get a product that is quality-controlled from start to finish. We produce our own acid open hearth steel, heat treating and tempering it carefully. Finished forgings are carefully inspected and checked to assure meeting customer specifications.

In addition to gear blanks, Standard Steel can furnish you with rings, flanges, shafts, wheels and special shapes—and furnish them *fast*. Next time you need forgings, get our quotation first. For a copy of our new bulletin, write us at Dept. 9446, Standard Steel Works Division, BLH Corporation, Burnham, Penna.

BALDWIN BLH LIMA-HAMILTON

STANDARD STEEL WORKS DIVISION
BALDWIN-LIMA-HAMILTON

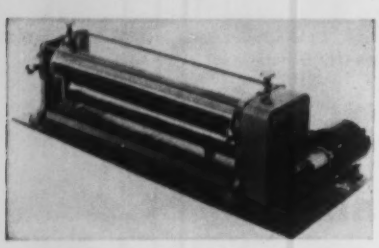
DIVISIONS: Austin-Western • Eddystone • Lima Electronics & Instrumentation • Hamilton • Pelton • Loewy-Hydropress • Madsen



spindle is stopped instantly and current is cut off before the brake is applied. *Write*: Hammond Machinery Builders Inc., 1611 Douglas Ave., Kalamazoo, Mich. *Phone*: 5-7151

Coating Machine

Sheet materials can be coated with paint, enamel, lacquer, oils, adhesives and other coatings with this bench unit.



Machine lengths are 8 to 52 in. Up to 3800 linear feet can be coated in an hour. A gallon of material will cover up to 850 sq ft. *Write*: L. R. Wallace & Co., 191 N. Pasadena Ave., Pasadena 3, Calif. *Phone*: Ryan 1-5463

Iron Powder Electrode

Speedex Type U is for welding mild and galvanized steel, structural welding, shipbuilding, tank fabrication and general maintenance.

The electrode can be used in all welding positions on any type current at high amperages. Slag removal and handling are easy.

The electrode operates with a quiet, moderately penetrating and easily directed arc. Spatter is light.

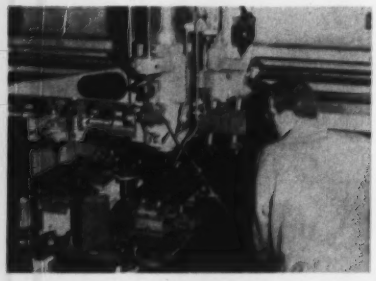
Weld deposits have good ductility and mechanical properties. *Write*: Metal & Thermit Corp., 100 Park Ave., New York 17, N. Y. *Phone*: Lexington 2-6300

Duplicator

The E-Series Duplimatics are electronic-hydraulic tracer control machines that offer speeds up to 100 ipm. A single probe gives both plane and depth control.

Tracing can be done within the full range of the machine tool. Conventional operation is not restricted.

The tracer control equipment can be supplied as original equipment or installed on existing machine

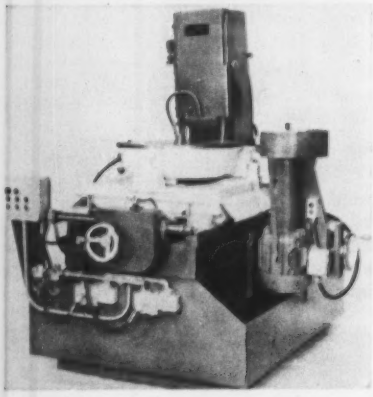


tools. Tracer performance can be predicted prior to installation by determining the natural frequency of the machine tool. *Write*: Tracer Control Co., 595 E. Ten Mile Rd., Hazel Park, Mich. *Phone*: Lincoln 2-7753

Rotary Belt Grinder

Circular parts 26 to 40 in. in diameter are finished with this abrasive belt unit.

An infeed mechanism carries rotating parts in against the belt.



Infeed travel is adjustable to a minimum of 0.0016 in. per revolution.

Parts are moved across the belt face by a reciprocating device with a 7-in. oscillating stroke.

Belt speeds are 2000 to 5000 sfpm. *Write*: Engelberg Huller Co., 831 W. Fayette St., Syracuse 4, N. Y. *Phone*: 4-3195

Hydraulic Fluid

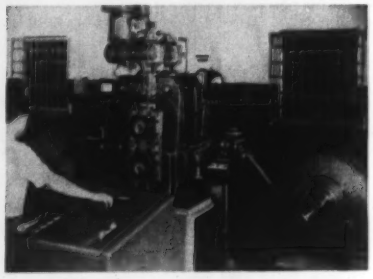
Houghto-Safe 1020 is a fire-resistant fluid for systems operating at temperatures above 150°F and for heavily loaded pumps and bearings.

The synthetic fluid is fortified with rust preventives and antifoaming agents. *Write*: E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa. *Phone*: Regent 9-7100

Cold Strip Mill

Thin gage ferrous and nonferrous strip up to 8 in. wide is processed at speeds up to 500 fpm by this 4-high reversing mill.

Rolls can be changed in 20 minutes, and the work roll diameter can be changed without affecting the linear rolling speed of the mill.



To handle a 0.125 to 0.001-in. range of strip, work rolls from 2½ to ¾-in. in diameter can be used.

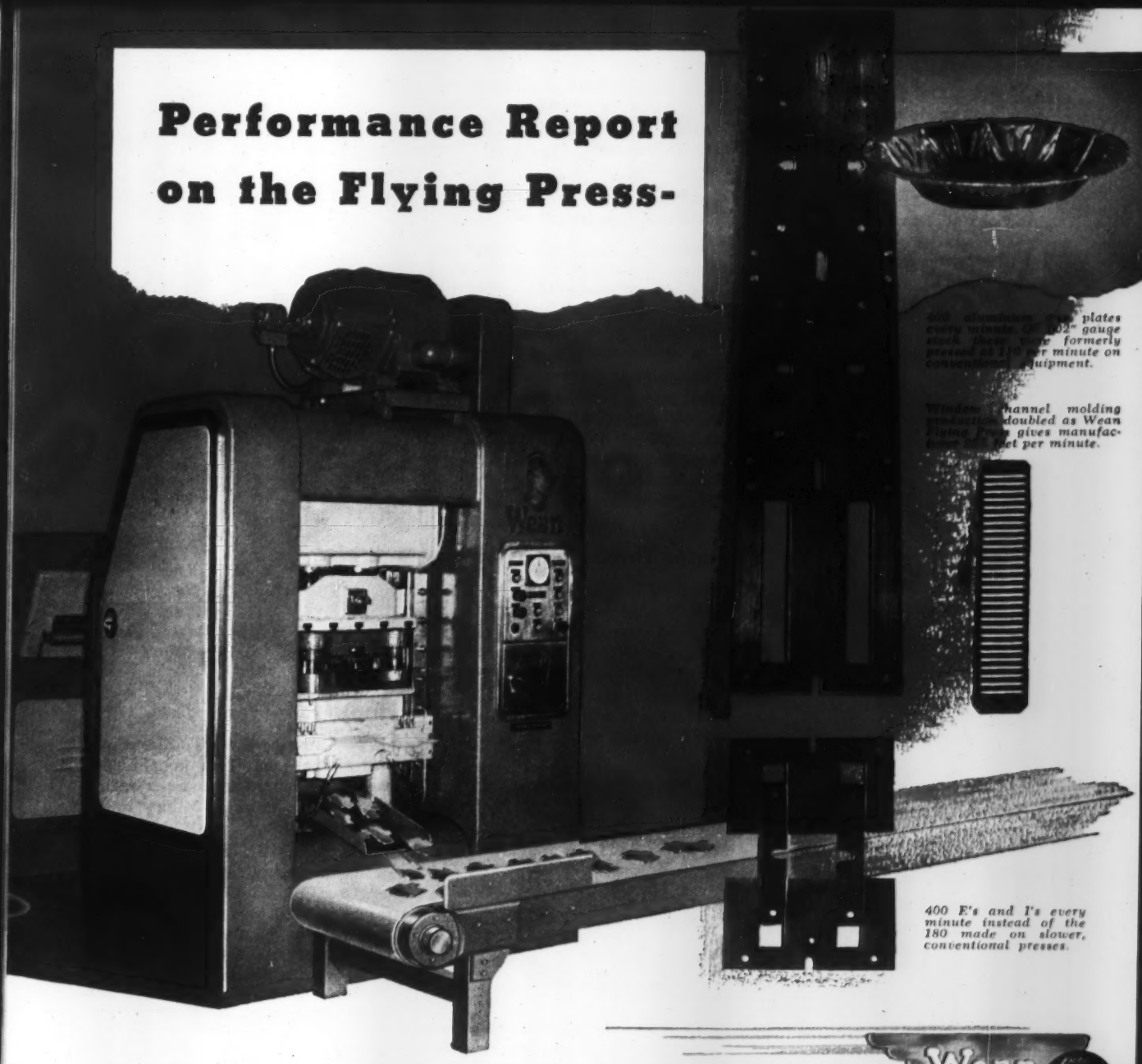
The rolls are made of vanadium alloy tool steel and are hardened to a minimum of Rockwell C-64. *Write*: Stanat Mfg. Co. Inc., 47-28 37th St., Long Island City 1, N. Y. *Phone*: Ravenswood 9-2420

Radial Drill

Linear and angular ram movements combine to make it possible to move this machine's drill head without disturbing the workpiece.

The ram is mounted on roller bearings to provide sensitive linear

Performance Report on the Flying Press-



plates gauge formerly minute on

channel molding doubled as Wean gives manufac- per minute.

400 E's and I's every minute instead of the 180 made on slower, conventional presses.

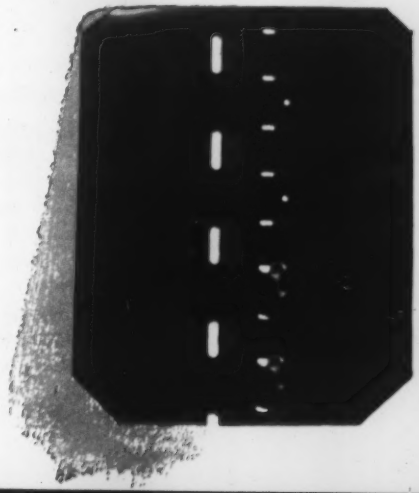
Revolutionary Wean Press continues to amaze the industry

Since it was first introduced to industry, the Wean Flying Press has commanded the interest of imaginative production people.

On paper, it looked good. Tests on the hand made prototype were even more convincing. But, could a production model achieve such levels under actual operating conditions?

For the answer—note the typical production figures set down here. In every case, the Wean Flying Press, using standard die sets, has established a performance record.

Why not acquaint yourself with this amazing press now? Contact the Wean Sales-Engineer in your area or write direct.



Shallow draw and punch work on .065 gauge stock boosted to 400 pieces per minute by Wean Flying Press.

Wean

EQUIPMENT CORPORATION

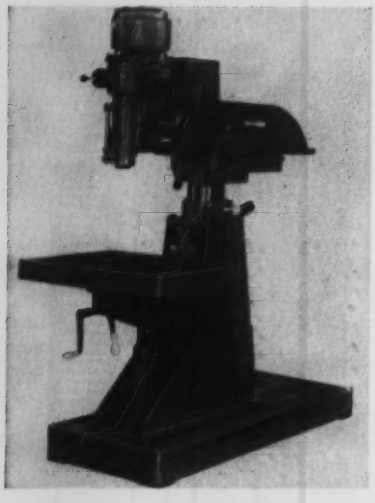
CLEVELAND • CHICAGO • DETROIT • NEWARK, N. J.

Cable: WEANCOR

9935

positioning of the drill head. The tube column raises vertically and rotates around its axis.

Rotation of the ram provides two work stations. Small parts are drilled on the 20 x 28 in. table. Large pieces are moved on to the rear platform of the machine.



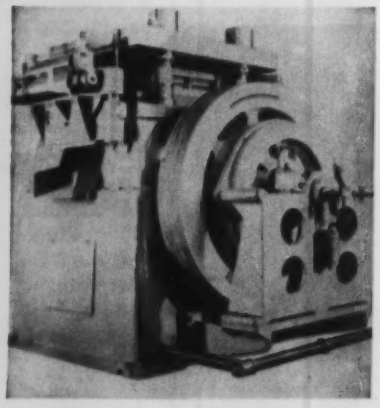
Spindle speeds range from 104 to 1200 rpm. *Write*: I. O. Johansson Co., 7248 St. Louis Ave., Skokie, Ill. *Phone*: Orchard 3-9234

Stamping Presses

This large flywheel press has a capacity of 350 tons. It can operate at speeds of 150 strokes a minute.

Eight long guiding surfaces assure accurate alignment of the top platen so that cocking due to off-center loads is minimized.

Total weight of the press is 102,000 lb, more than enough to absorb the stresses and shock of high speed operations. *Write*: Brandes Press Co., 6408 Euclid Ave., Cleveland 3, O. *Phone*: Endicott 1-4343



Plastic Pipe Joint

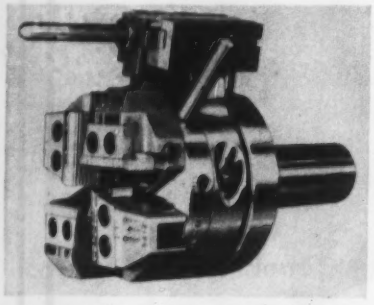
Here's a slip type expansion joint (sizes are 1, 2 and 3 in.) made of unplasticized polyvinyl chloride. Reducing bushings make it possible to use the joints with pipes of smaller diameters.

The joint is for use with rigidly fixed piping which is subject to thermal cycles. All sizes allow an expansion of 3¾-in. *Write*: Tube Turns Plastics Inc., 2929 Magazine St., Louisville 11, Ky. *Phone*: Spring 5-6431

Taper Threading Head

The 5C Landmatic die head will thread ⅛ to ¾-in. pipe.

A taper attachment expands the chasers at a rate equal to the required taper as the die head advances onto the workpiece. Precision threads which meet dry seal specifications are produced.



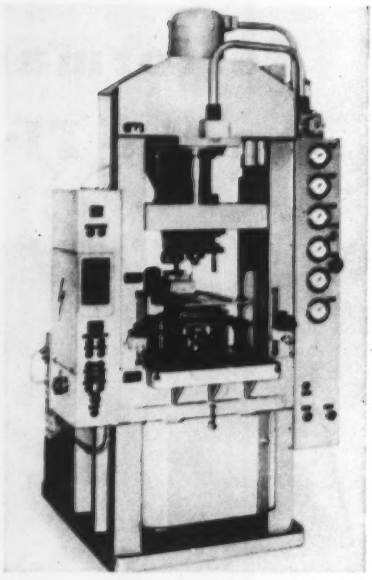
An adjustable spring mechanism compensates for the cam lead for threads of different pitches.

The same chasers can be used for all pipe diameters requiring the same pitch. *Write*: Landis Machine Co., Waynesboro, Pa.

Powder Metal Press

This machine has a hydraulically floated die table with an adjustable resistance. Tools permit the compacting of parts that have many projections in the pressing plane without additional built-in press movements.

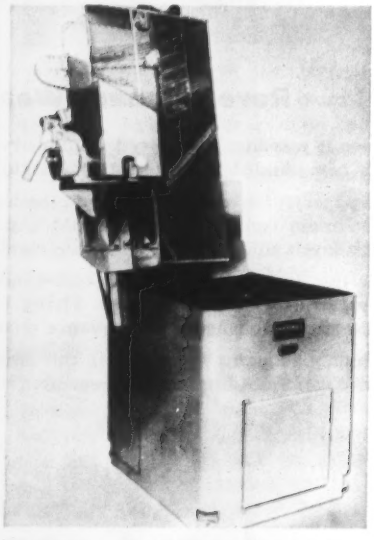
All tool adjustments and most press adjustments are made between the press platens which allow as much as 39 in. of working space. *Write*: Mannesmann-Meer Engineering & Construction Co. Inc., 233 Broadway, New York 7, N. Y. *Phone*: Worth 4-3730



Hopper Feeder

The Model 2200-B elevating feeder has 4 cu ft of hopper capacity. The transfer mechanism moves parts from a rolling to a sliding position.

Work range for rolling parts is 3 in. in diameter and 3/16 to 1 in. in length. For sliding parts, the range is 3/16 to 1 in. in diameter and 3 in. in length. *Write*: Feedall Inc., P. O. Box 47, Willoughby, O. *Phone*: Willoughby 2-8100



STRESS

can be a hidden enemy of circular parts like jet-engine rings. To insure physical and metallurgical accuracy, specify Cleve-Weld welded rings.

Top Jet-Engine makers specify Cleve-Weld rings

The *design, metallurgy* and *production* of welded circular parts have been Cleve-Weld specialties for 45 years. We've worked with materials from carbon to stainless and the latest aircraft alloy steels. Cleve-Weld has the specialized equipment and experience to do exacting jobs. These are the reasons why America's jet-engine makers procure Cleve-Weld rings. Pratt & Whitney J-57, Wright Aeronautical J-65, General Electric J-47 and other great jet engines testify to our ring accuracy.

Cleve-Weld is also a prime supplier of truck and tractor rims, rings, bands and gear blanks. *Make Cleve-Weld your primary source for all rolled and welded circular parts, too.* We'll show you why in dollars and cents. Write Circular Welded Products Sales Department below.

THIS IS THE BASIC CLEVE-WELD PROCESS. Rectangular bars or special contoured sections of steel are rolled into a circular form. Next, the part is welded and then expanded into a true circle. This tests the weld and insures accuracy. Later operations add stress relief and desired hardness.

EXAMPLES OF CLEVE-WELD PROCESS PRODUCTS

Another AMF Product
CLEVE-WELD PROCESS
RIMS · RINGS · WELDMENTS

CLEVELAND WELDING DIVISION
AMERICAN MACHINE & FOUNDRY COMPANY
Cleveland 11, Ohio

SEND THIS COUPON NOW
Cleveland Welding Division—Dept. ST-610
American Machine & Foundry Company
West 117th Street and Berea Road
Cleveland 11, Ohio

Please send me:
- ☐ Truck Rim Catalog
- ☐ Tractor Rim Catalog
- ☐ Brochure on Cleve-Weld Process

Name_____

Title_____

Attach to your company letterhead and mail

NEW literature

Write directly to the company for a copy

Self-Locking Nuts

This 6-page bulletin describes nuts for automotive, electronic, machine tool and appliance assembly. Con-Torq Inc., New Britain, Conn.

Stainless Tubing

Bulletin TDC 182, 4 pages, gives information on machining stainless steel tubing and pipe. Chicago Steel Service Co., Kildare Ave. & 45th St., Chicago 32, Ill.

Checks and Tags

This 42-page illustrated catalog contains descriptive and technical data on metal name plates, badges, tags and checks. Jas. H. Matthews & Co. Inc., 3942 Forbes St., Pittsburgh 13, Pa.

Water Chillers

Bulletin 5925, 16 pages, describes packaged water chillers for air conditioning or industrial cooling. American Blower Corp., Detroit 32, Mich.

Toolroom Grinding

Here is a 222-page handbook which includes information on the sharpening of high speed steel, nonferrous cast alloy and cemented carbide tools. Norton Co., Worcester 6, Mass.

Furnace Controls

Bulletin B43-1, 44 pages, describes furnace and oven controls. Industrial Division, Minneapolis-Honeywell Regulator Co., Wayne & Windrim Ave., Philadelphia 44, Pa.

Pipe and Tubing

Bulletin 146-A gives the properties of an intermediate chromium-molybdenum alloy steel for elevated temperature service. It is used in pipe, tubing and welding fittings—4 pages. Tubular Products Division, Babcock & Wilcox Co., Beaver Falls, Pa.

Resistance Welding

Bulletin 4-#7 is a case history covering the use of resistance welding in fabricating miter joint aluminum window frames. Department L-12, Sciaky Bros. Inc., 4915 W. 67th St., Chicago, Ill.

Vibration Control

Case histories in bulletin K7A, 7 pages, shows how machinery mountings for vibration and noise control increase production and profits. Korfund Co. Inc., 48-40E 32nd Place, Long Island City 1, N. Y.

Epoxy Properties

Here is a chart which lists physical and electrical data on 27 formulated epoxy resin systems. Furane Plastics Inc., 4516 Brazil St., Los Angeles 39, Calif.

Positioning Control

Linear and angular positioning systems for large drill presses, milling machines, grinders, jig borers, gear cutters and lathes are described in bulletin 819, 12 pages. Farrand Controls Inc., 4401 Bronx Blvd., New York 70, N. Y.

Temperature Cabinets

Hot and/or cold temperature cabinets with temperature ranges from −200 to +300°F are described in a 4-page bulletin. Weber Engineering Corp., P. O. Box 217, Indianapolis, Ind.

Grooved Fasteners

Here is a 24-page bulletin which describes grooved pin fasteners. Driv-Lok Pin Co., Sycamore, Ill.

Thermistor Manual

TH-13A, 53 pages, describes thermally sensitive resistors for automatic detection, measurement and control of physical energy. Metallurgical Products Department, General Electric Co., Detroit 32, Mich.

Thrust Mechanism

Bulletin GEA-1614D, 8 pages, describes the Thrustor, a unit that produces a straight line thrust electrically. General Electric Co., Schenectady 5, N. Y.

Rectangular Magnets

Bulletin 150-A, 2 pages, describes a line of rectangular and rail handling magnets. Ohio Electric Mfg. Co., 5400 Dunham Rd., Maple Heights, Cleveland, O.

Conveyors

Catalog 500, 47 pages, describes conveyors for bulk materials and small parts. Prab Conveyors Inc., 30121 Groesbeck Highway, Roseville, Mich.

Hardening Rail Ends

Bulletin S-1051, 4 pages, gives information on an automatic method of selectively hardening the wearing surface at the end of a rail. Selas Corp. of America, Dresher, Pa.

Electrode Guide

Catalog 1318, 54 pages, gives you the information needed to pick the right electrode for the job. Air Reduction Sales Co., division of Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y.

Gas Analysis

Equipment for measuring gas in air or binary mixtures and a description of the direct thermal conductivity method of measuring gases are presented in bulletin ND46-91(6), 8 pages. Leeds & Northrup Co., 4907 Stenton Ave., Philadelphia 44, Pa.

Forgings

An 8-page bulletin lists the advantages of forgings made of carbon, alloy and stainless steel. Indiana Forge & Machine Co., Dickey Rd. & Watling St., East Chicago, Ind.

Aluminum Cleaners

A 4-page bulletin describes aluminum cleaners and systems used to prepare the metal for welding. Northwest Chemical Co., 9310 Roselawn Ave., Detroit 4, Mich.

Carbide Tools

Uses of solid carbide end mills, rotary files and miniature cutters are covered in an 8-page bulletin. Abrasives Division, Elgin National Watch Co., 107 National St., Elgin, Ill.

Hollow Aluminum

An 8-page bulletin discusses tolerances, mechanical properties and uses of hollow aluminum bar stock. Harvey Aluminum Sales Inc., 19200 S. Western Ave., Torrance, Calif.

Control Valves

Bulletin C-7, 8 pages, presents a line of thermostatic control valves. Lawler Automatic Controls Inc., Mt. Vernon, N. Y.

Testing Machines

A 12-page booklet describes machines that determine hardness, ductility and the tensile, compressive and traverse strength of metal parts. Detroit Testing Machine Co., 9390 Grinnell Ave., Detroit 13, Mich.

Heat Treating Furnaces

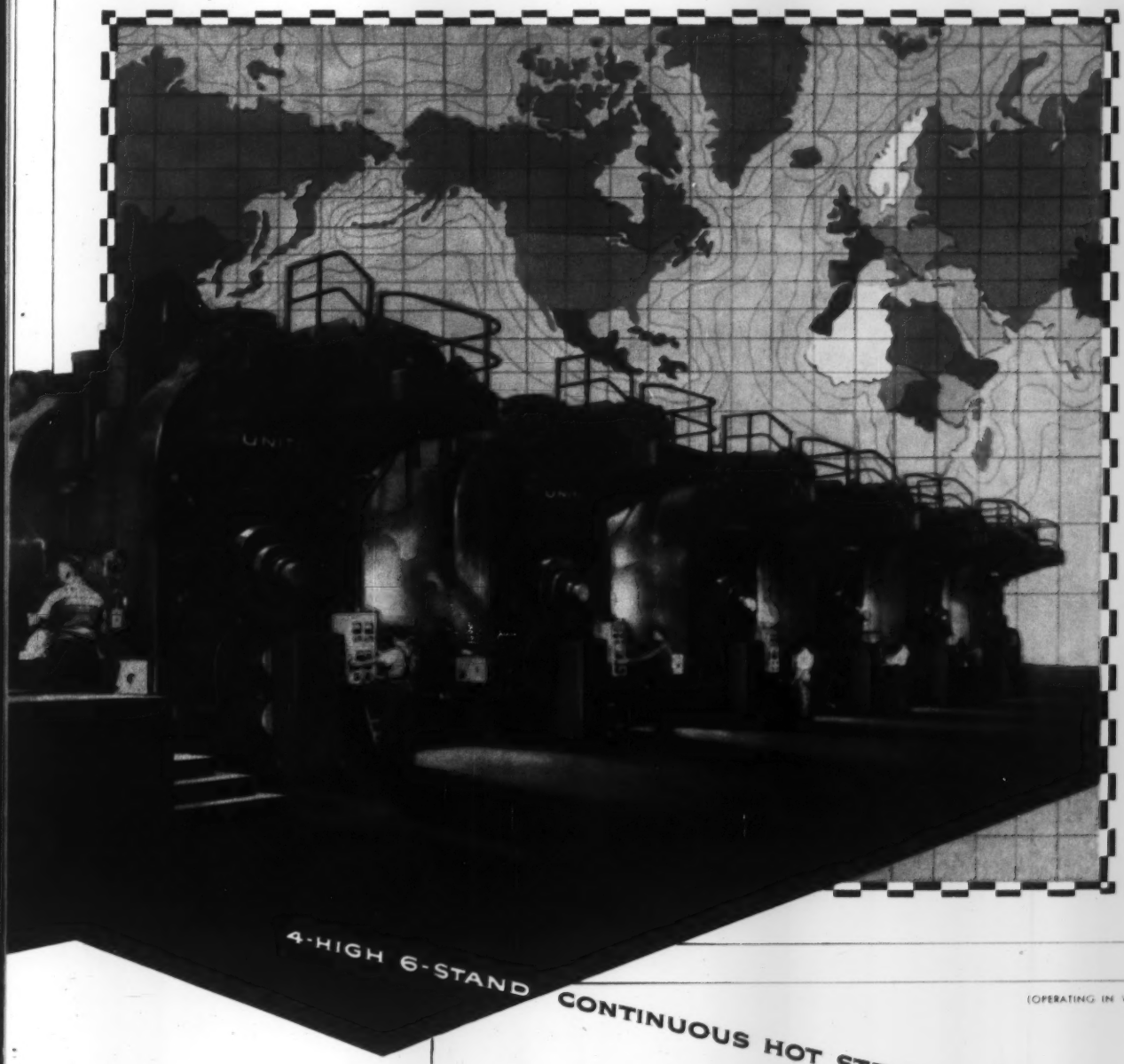
Controlled atmosphere, reciprocating hearth furnaces are described in bulletin 850.10, 12 pages. American Gas Furnace Co., 250 W. Jersey St., Elizabeth, N. J.

Boring Tools

This 12-page bulletin presents a line of boring tools for toolroom or production use. Moore Special Tool Co. Inc., 740 Union Ave., Bridgeport 7, Conn.

Brush Springs

Data for the design of constant-pressure brush springs that go into rotating electrical machinery are given in bulletin 310P, 21 pages. Neg'Ator Division, Hunter Spring Co., Lansdale, Pa.



4-HIGH 6-STAND CONTINUOUS HOT STRIP MILL

(OPERATING IN WALES)

DESIGNED AND BUILT BY

UNITED

ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at: PITTSBURGH • VANDERGRIFT • YOUNGSTOWN • CANTON
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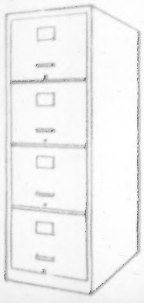
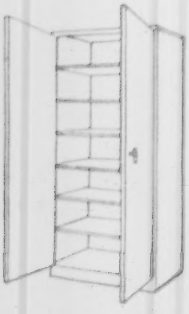
UNITED can serve you no matter where in the world you are.

Acme-Newport Steel



ELECTED TO OFFICE



ECONOMICAL WATER-RAIL-TRUCK DELIVERY

This Company is ideally situated on the Mississippi-Ohio River system and the great Cincinnati rail-truck hub. New barge facilities, 7 major railroads and 143 motor carriers enable Acme-Newport to give economical, dependable delivery to the entire area of the Middle West and South.

Acme-Newport products consistently win the votes of office equipment manufacturers for use in steel desks, chairs, tables, cabinets and numerous electrical devices. To meet the exacting demands of scores of industries, well-trained personnel exercise rigid control and close supervision throughout each step in the steelmaking process. This conscientious service, plus modern facilities and strategic location in the heart of America's greatest industrial development, makes this 70-year-old mill an ideal source for any of the steel products listed below. Look them over, then give us the opportunity to discuss your specific requirements.

Acme-Newport Steel COMPANY

NEWPORT, KENTUCKY

A SUBSIDIARY OF ACME STEEL COMPANY

PRODUCTS . . . . . **Cold-Rolled Sheets • Hot-Rolled Steel in Coil • Hot-Rolled Pickled Steel in Coil • Hot-Rolled Sheets • Hot-Rolled Pickled Sheets Electrical Sheets • Alloy Sheets and Plates • Electric Weld Line Pipe • Eave Trough and Conductor Pipe • Culverts**

STEEL

October 29, 1956

Market Outlook

BUSINESS for the steel industry promises to be as sound as the product it makes.

Here's why: Steel demand will be for near-term consumption rather than inventory building. Consumption requirements will be strong. Inventories are not top-heavy.

Buying for inventory can be only temporary. Eventually, you run out of space or money, perhaps both. Buying for consumption is a continuous thing—as long as the consumers' business is good—and it is.

BETTER BUSINESS— Metal consumers have far more orders for their goods now than they did a year ago when industrial activity was setting records. U. S. Department of Commerce figures show dollar volume of orders on hand exceeds year-ago levels by 17 per cent among the metal fabricating group, by 29 per cent among the machinery manufacturers and by 25 per cent among the transportation equipment people. Price inflation can't account for all these increases.

CONSERVATIVE BUYING— Metal procurement has hardly kept up with those gains. Order backlogs of primary metal producers are only 18.5 per cent above those of a year ago. This is statistical evidence that metal consumers are ordering no more (and perhaps less) than they will need. It looks like some of them will live partly on inventory, a further suggestion that stocks will be lowered rather than built up. So, buying will represent business on the books rather than hopes or mere hoarding. A three-year labor contract in the steel industry eliminates a need for stockpiling against a strike.

RECORD EXPECTED— There is enough soundness in the outlook to lead a large steel producer to believe steel ingot production next year will average 91 per cent of capacity. Since capacity will rise to approximately 132 million net tons, it means next year's yield would be approximately 120 million tons—a record. The present record is 1955's 117 million tons.

The biggest steel consumer—the automobile industry—now thinks 1957 will be 10 per cent better for passenger car sales than 1956, which is shaping up as a 6 million unit year. The 6.6 million predicted for next year would be exceeded only by 1950 and 1955.

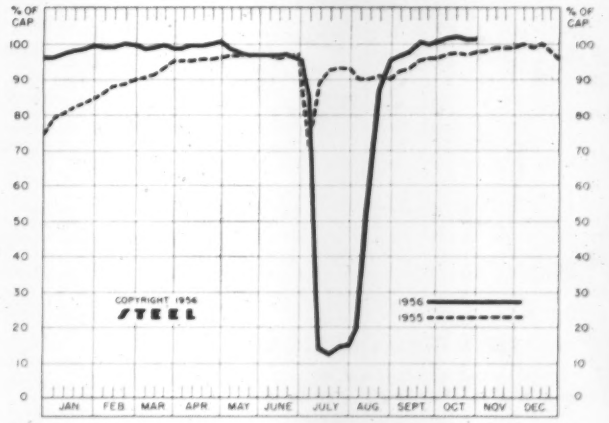
ABOVE CAPACITY— There are enough steel orders on the books to keep mills operating above their Jan. 1 rated capacity. In the week ended Oct. 28, they continued to produce steel for ingots and castings at 101.5 per cent of capacity.

The pinch may ease for awhile on the supply of one product—nickel bearing stainless steel. Some of the nickel that had been destined for the government stockpile is being diverted to private industry.

SCRAP TURNS UPWARD— Expectations of continued good steel business are reflected by the scrap market. It's firming again. STEEL's price composite on steelmaking scrap rose in the week ended Oct. 24 to $57 a gross ton—33 cents over the preceding week.

STEEL PRICES— Steel price changes are minor. STEEL's price composite on finished steel holds at $137.48 a net ton. In Germany, steel base prices and extras have been hoisted a total of $9 a net ton. German prices have been below those in Western Europe and the U.S.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Oct. 28	Change	Same Week 1955	Same Week 1954
Pittsburgh	102	+ 2*	104	73
Chicago	101.5	+ 0.5*	98.5	79
Mid-Atlantic	101	0	98	69
Youngstown	102	+ 1	100	72.5
Wheeling	103.5	+ 1	100	80
Cleveland	107	+ 3*	103.5	88
Buffalo	107.5	0	105	87.5
Birmingham	95.5	0	94	71
New England	85	0	90	59
Cincinnati	100.5	+ 7.5	90	69.5
St. Louis	94.5	— 8.5	97	84
Detroit	100	— 1	100.5	80
Western	105	+ 1	91	81
National Rate	101.5	0	98	75

INGOT PRODUCTION‡

	Week Ended Oct. 28	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	154.9†	155.3	155.8	150.2
NET TONS (In thousands)	2,489†	2,495	2,502	2,413

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

Metalworking Outlook—p. 73

Technical Outlook—p. 121

Our business is staked on it

. . . will you try one heat on it?

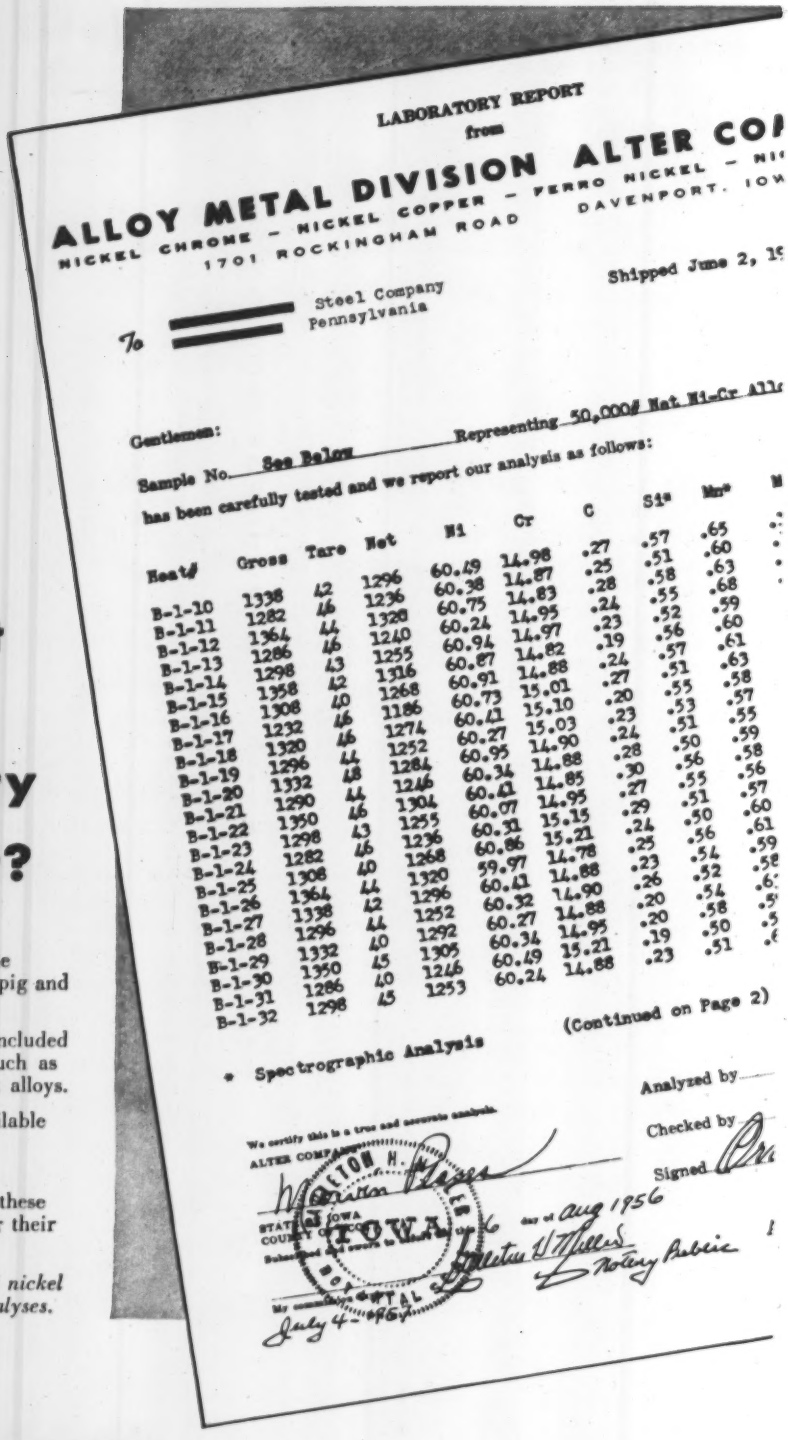
THIS IS OUR LABORATORY REPORT on one customer's order for Alloymet nickel base pig and shot* for stainless steel production.

It gives a complete analysis of *each heat* included in the total order. A notarized report such as this travels with every order of Alloymet alloys.

These alloys of certified analysis are available at approximately 5% over the cost of nickel alloy scrap.

Contact us now — discover why use of these alloying agents more than compensates for their slight premium in cost.

**Alloymet available in a complete range of nickel chrome, nickel iron and nickel copper analyses.*



LABORATORY REPORT
from
ALLOY METAL DIVISION ALTER CO
NICKEL CHROME – NICKEL COPPER – FERRO NICKEL – NI
1701 ROCKINGHAM ROAD DAVENPORT, IOW

To Steel Company
Pennsylvania

Shipped June 2, 19

Gentlemen:

Sample No. See Below Representing 50,000# Nat. Ni-Cr All
has been carefully tested and we report our analysis as follows:

Heat#	Gross	Tare	Net	Ni	Cr	C	Si*	Mn*	M
B-1-10	1338	42	1296	60.49	14.98	.27	.57	.65	
B-1-11	1282	46	1236	60.38	14.87	.25	.51	.60	
B-1-12	1364	44	1320	60.75	14.83	.28	.58	.63	
B-1-13	1286	46	1240	60.24	14.95	.24	.55	.68	
B-1-14	1298	43	1255	60.94	14.97	.23	.52	.59	
B-1-15	1358	42	1316	60.87	14.82	.19	.56	.60	
B-1-16	1308	40	1268	60.91	14.88	.24	.57	.61	
B-1-17	1232	46	1186	60.73	15.01	.27	.51	.63	
B-1-18	1320	46	1274	60.41	15.10	.20	.55	.58	
B-1-19	1296	44	1252	60.27	15.03	.23	.53	.57	
B-1-20	1332	48	1284	60.95	14.90	.24	.51	.55	
B-1-21	1290	44	1246	60.34	14.88	.28	.50	.59	
B-1-22	1350	46	1304	60.41	14.85	.30	.56	.58	
B-1-23	1298	43	1255	60.77	14.95	.27	.55	.56	
B-1-24	1282	46	1236	60.31	15.15	.29	.51	.57	
B-1-25	1308	40	1268	60.86	15.21	.24	.50	.60	
B-1-26	1364	44	1320	59.97	14.78	.25	.56	.61	
B-1-27	1338	42	1296	60.41	14.88	.23	.54	.59	
B-1-28	1296	44	1252	60.32	14.90	.26	.52	.58	
B-1-29	1332	40	1292	60.27	14.88	.20	.54	.6	
B-1-30	1350	45	1305	60.34	14.95	.20	.58	.5	
B-1-31	1286	40	1246	60.49	15.21	.19	.50	.5	
B-1-32	1298	45	1253	60.24	14.88	.23	.51	.6	

(Continued on Page 2)

* Spectrographic Analysis

Analyzed by
Checked by
Signed

We certify this to be a true and accurate analysis.
ALTER COMPANY

STATE OF IOWA
COUNTY OF SCOTT

Subscribed and sworn to before me this 6th day of Aug 1956

Notary Public

My commission expires July 4 1957

ALTER COMPANY
PHONE 6-2561 • TELETYPE DV 588
ALLOY METAL DIVISION
1701 ROCKINGHAM ROAD
DAVENPORT, IOWA

World's largest producer of secondary nickel alloys of certified analysis

Enough Iron Ore for Winter

Even if the shipping season closes on schedule, steel mills will have plenty of ore to see them through. U.S. Steel, hit by boatmen's strike, feels it's "out of the woods"

THERE'LL be no shortage of iron ore this winter despite the five-week steel strike and the long tie-up of a large part of the ore fleet this summer.

"We feel we are out of the woods now," says a spokesman for U.S. Steel Corp., Pittsburgh. Most of the steel industry feels that if the corporation is out of the woods, so are other producers. After all, they figure, U.S. Steel not only is the largest user of ore but also was the hardest hit by the interruption of ore shipments after the steel strike. They also point out that while the industry lost five weeks of ore production, there were also five weeks when practically no ore was consumed. Stocks on hand (see table) were virtually unaffected.

About Equal — Even though shipments of Lake Superior ore through August are still about 12.5 million tons behind those in the year ago period, stocks on hand (U.S. and Canadian) of that ore were greater on Sept. 1 than on the same date last year. The Lake Superior Iron Ore Association reports stocks of 40,328,496 gross tons this year, compared with 39,505,818 gross tons a year ago. Despite the increase, the industry is in relatively the same position because of the greater capacity today.

There is still the definite possibility that rail shipments of certain ores will be more important this year than in the past. One steel company reports that its supply of open-hearth grade would be cut short were it not for rail shipments of foreign ores from the East Coast. Walter Sterling, president of Cleveland-Cliffs Iron Co., Cleveland, says imports this year will total about 31 million gross tons.

Normal Season—While the ore fleet is trying to make up for some of the lost time, there is little chance of the shipping season continuing longer than it normally would. The U.S. Steel spokesman says there is no predicting when the boats will tie up, because it all depends on the weather. But a Pittsburgh Steel Co. executive says that even if the season closes during the first week of December —which is normal—there will be no shortage of ore next year.

IRON, ORE STOCKS, SEPT. 1, 1956

(Gross tons)

Stocks at Furnace Yards	LAKE SUPERIOR ORES U.S.	LAKE SUPERIOR ORES Canada	OTHER ORES U.S.	OTHER ORES Canada	Foreign Ores	Total On Hand
Eastern	4,460,099	313,411	202,633	950,907	2,010,485	7,937,535
Pitts-Youngstown	9,628,527	741,418	79,668	2,003,770	1,840,273	14,293,656
Cleve-Detroit	6,176,071	477,857	186,079	433,059	128,037	7,401,103
Chicago	8,300,632	(a)	(a)	.....	(a)	8,300,632
Southern	(a)	.....	1,670,929	(a)	1,053,560	2,724,489
Western	.....	.....	643,144	.....	.....	643,144
Total at yards	28,565,329	1,532,686	2,782,453	3,387,736	5,032,355	41,300,559
Stocks at U.S. docks						
Lake Erie	6,527,897	327,909	.....	343,445	274,877	7,474,128
Other U.S.	.....	.....	.....	.....	.....	.....
Total at docks	6,527,897	327,909	.....	343,445	274,877	7,474,128
Total U.S. Stocks	35,093,226	1,860,595	2,782,453	3,731,181	5,307,232	48,774,687
At Canadian Furnace Yards	3,189,930	184,745	.....	1,030,054	125,348	4,530,077
Total—U.S. & Canada	38,283,156	2,045,340	2,782,453	4,761,235	5,432,580	53,304,764

IRON ORE CONSUMPTION, JULY AND AUGUST, 1956

(Gross tons)

In U.S. DISTRICTS	LAKE SUPERIOR ORES U.S.	LAKE SUPERIOR ORES Canada	OTHER ORES— U.S.	OTHER ORES— Canada	FOREIGN ORES	TOTAL FOR— Months July-Aug.	Yr. To Date End-Aug.
Eastern	634,491	47,256	215,874	294,394	607,253	1,799,262	14,579,983
Pitts-Youngstown	2,219,711	148,449	92,684	439,032	346,919	3,246,795	25,590,409
Cleve-Detroit	1,078,543	86,124	55,463	64,513	54,697	1,339,340	9,625,131
Chicago	1,859,068	(a)	(a)	.....	(a)	1,859,068	14,828,255
Southern	(a)	.....	720,566	(a)	240,766	961,332	5,586,309
Western	.....	.....	728,142	.....	.....	728,142	4,338,593
IN U.S. BLAST FURNACES	5,007,523	247,017	1,283,939	544,832	664,294	7,727,605	59,108,690
Steel Furnaces	161,061	1,237	99,446	6,018	293,967	561,729	5,018,274
Agglomerating plants	623,061	33,569	449,162	245,218	255,313	1,606,323	10,321,135
Miscellaneous	168	.....	182	1,871	36,061	38,282	100,581
TOTAL U.S.	5,791,813	281,823	1,812,729	797,939	1,249,635	9,933,939	74,548,680
IN CANADA:							
Blast furnaces	462,990	169,202	.....	180,133	.....	812,375	3,015,607
Steel furnaces	13,327	.....	.....	2,824	33,385	49,536	186,002
Agglomerating plants	133,963	5,075	.....	33,425	2,993	175,456	635,000
Miscellaneous	194	.....	.....	.....	.....	194	248
TOTAL CANADIAN	610,474	174,277	.....	216,382	36,378	1,037,511	3,836,857
Total U.S. and Canada	6,402,287	456,100	1,812,729	1,014,321	1,286,013	10,971,450	78,385,537
CONSUMPTION YEAR TO DATE							
In U.S.	48,055,301	1,795,662	11,806,595	3,555,453	9,335,669		
Canada	2,494,863	449,796	.....	762,188	130,010		
Total Consumption	50,550,164	2,245,458	11,806,595	4,317,641	9,466,679		

a—Small tonnage included in other districts to avoid disclosure.
Source: Lake Superior Iron Ore Association, compiled jointly with American Iron & Steel Institute.

Pig Iron . . .

Pig Iron Prices, Page 176

Blast furnace production (pig iron, ferromanganese and spiegeleisen) totaled 6,932,648 net tons in September, reports the American Iron & Steel Institute. This compares with 6,703,366 tons in the like 1955 month.

Output consisted of 6,873,064 tons of pig iron and 59,584 tons of ferromanganese and spiegeleisen in the month. In the like month last year, pig iron accounted for 6,653,578 tons, and ferromanganese and spiegeleisen, 49,788 tons.

Production in the first nine months this year was 54,264,932 tons, of which 53,794,955 tons were pig iron, and 469,977 tons were ferromanganese and spiegeleisen. In the like period last year output totaled 57,178,647 tons, of which 56,680,072 tons were pig iron, and 498,575 tons were ferromanganese and spiegeleisen.

The decision of Bethlehem Steel Co. to withdraw permanently from the merchant pig iron trade has sent many consumers scurrying

for new sources of supply.

Bethlehem's withdrawal is scheduled for Jan. 1, by which time the company expects to have all of its merchant iron commitments cleaned up. Its decision applies to all grades (basic, foundry, malleable, bessemer and low phos), but not to ferromanganese.

The announcement has special impact on the trade in the Mid-Atlantic district because of Alan Wood Steel Co.'s plans to temporarily withdraw from the market while enlarging and rehabilitating its smaller blast furnace at Swedeland, Pa.—in fact, it is under way now. The furnace is expected to go down Jan. 1 for a period of probably five months.

Merchant pig iron buyers in the district may have to absorb substantial freight differentials before the situation rights itself.

In other districts, pig iron continues to move at an even pace, with supply and demand in good balance. Most sellers anticipate good activity right up to the year-end holidays. Consumers are keeping inventories low—around 30-day requirements.

Youngstown Sheet & Tube Co. has relighted its No. 1 blast furnaie (an 850-ton unit) at its Campbell Works. It had been down 28 days for relining.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 177

Inland Steel Co. will up its coke output about 20 per cent in the next two weeks when the first of 87 Koppers ovens in its new No. 7 battery comes into full production. Annual capacity of the new ovens is 450,000 tons.

No. 7 battery occupies the site of the first coke battery fired at the Indiana Harbor Works—it was started in 1913 and dismantled in 1950. Output of the new battery will push Inland closer to being self-sustaining in its coke needs. But recent increases in blast furnace production will make outside purchases necessary.

New coke chemical facilities are being rushed to completion to handle additional coke chemical products which will come from the new ovens. Included are a new ammonia absorber to make ammonium sulphate, new boosters for distribution of gas at increased pressure and new benzol plant equipment.

An increase in prices on various metallurgical grades of industrial coke are expected most any time due to higher coal prices. Foundry coke is not likely to be affected because prices on that grade recently were revised upward.

J. L. Mauthe, president, Youngstown Sheet & Tube Co., Youngstown, commenting on the promising outlook for capacity steel operations the remainder of this year, reports the company's new coke battery at its Indiana Harbor, Ind., works is beginning to push coke. The 75 ovens have a daily capacity of about 1250 tons.

Tin Plate . . .

Tin Plate Prices, Page 171

The impending increase in tin mill prices ($2 a ton, effective Nov. 1) is having no effect on demand, producers say. Mills are

ERIE Bolts • Studs • Cap Screws • Nuts
In Alloys • Stainless • Carbon • Bronze

Only the hands of the specialist can produce fasteners which will meet your design and engineering specifications with precise accuracy. Erie has been doing just that for more than 40 years . . . producing to customer specifications bolts, studs, cap screws and nuts for use in extreme temperature, corrosion and tensile applications for a wide diversity of industries. Submit your specifications to us with confidence.

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ERIE BOLT & NUT CO.
Erie, Pennsylvania
Representatives in Principal Cities

taking orders for the first quarter of next year. They say demand is firm for all tin mill products as the market continues to trend away from the former seasonal pattern of a decline in winter demand.

One major producer has already closed its first quarter order books. Because of the heavy demand, the mills continue to run behind on deliveries. They hope to trim the carryover of unfilled orders by the end of this year.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 169

Even though winter will hamper some forms of building construction, strong demand for concrete reinforcing bars is expected to continue for the next six months. The shortage of structural steel is diverting an increasing number of building jobs to reinforced concrete. The projected road building program will take heavy bar and reinforcing tonnage far into the future.

Inquiry for bars is reported active in the Pacific Northwest despite the lateness of the building season. District rolling mills hold substantial order backlogs, and they report considerable tonnage remains to be placed. Pending awards include 600 tons for the second power unit at Ft. Peck dam, Montana.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 170 & 171

Shipments of steel shipping barrels in August totaled 3,068,441 units, compared with 3,443,519 in July and 3,330,496 in August, 1955, reports the U.S. Census Bureau. Total for the first eight months was 26,527,210, against 24,505,740 in the like 1955 period.

The movement of steel shipping packages, kegs and pails varied little in August from the preceding month, 7,653,277 units against 7,630,040. Nor was there much change from a year ago when 7,523,648 units were shipped. Total for the first eight months was 56,809,019, against 52,344,477 in the same 1955 period.

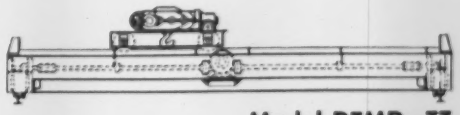
Most producers of cold-rolled sheets no longer are concerned about full order books in December. Practically all are booked to capacity for that period, and they look for year-end arrearages to average around two to three weeks' production.

Such a carry-over would be almost as heavy as that indicated in hot-rolled sheets. This, in a measure at least, reflects improvement in automotive specifying, which up to now has been disappointing.

Over recent weeks, sheetmakers have been faced with demand for more hot-rolled tonnage than they cared to accept, pending a clearer picture as to auto requirements for cold-rolled. The auto demand picture is beginning to clear up, with more cold-rolled specifications coming through for November and December delivery.

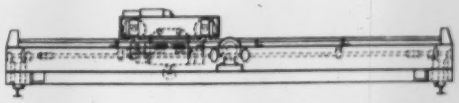
Changes in the pattern of auto orders have not been reflected to any great extent in the order books of Pittsburgh district mills. One of the largest producers there says auto makers' orders for cold-rolled increased only slightly for

STANDARD HEADROOM
Provides highest hook height with top-running trolley and foot mounted hoisting unit.



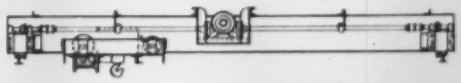
Model DTMD—TT

MEDIUM HEADROOM
Here the hoisting unit is rigidly suspended from the top-running trolley to reduce clearance over rail.



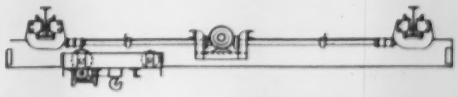
Model DTMD—LT

LOW HEADROOM
Under-running trolley permits unusually high hook lift. Use it where clearance under bridge must be maximum.



Model DTMD—UT

SUSPENDED TRACK
Operates on lower flange of crane runway suspended from roof guiders or other overhead support. Use also where load transfer is desired.



Model DUMD—UT

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ABELL-HOWE COMPANY 7747 Van Buren Street • Forest Park, Illinois

December as contrasted with November specifications. October demands were under expectations.

The opinion most commonly expressed at Pittsburgh is that the mills would be pleased to have more sheet orders from the auto builders. But sales managers point out that the auto plants can fill their restricted fourth quarter needs from mills in Detroit and Cleveland without reaching into the Pittsburgh market for heavy tonnage. They also say some auto plants still hold substantial sheet inventories.

There is no question that the outlook in the sheet market, notably in cold rolled, is better than it was a few weeks back. Contributing to this better market situation is the fact most consumers appear to have worked off excess inventories. However, some New England consumers are still asking for shipment deferments on cold-rolled through November and December. Most hot-rolled sheet tonnage is being taken up by area buyers, the bulk of orders involving specialties.

In general, market observers are closely watching the buying trend in the auto industry. A spurt in automotive requirements will enliven the market noticeably. There is nothing in the near-term outlook to suggest any immediate lessening in over-all demand for sheets.

Steel Bars . . .

Bar Prices, Page 169

Although there still is some hot carbon bar tonnage available for delivery before year end against new orders, most mills are completely sold out for the period. Those that are not booked full are confident they will have taken in about all the business they can handle before the quarter closes.

Where the mills have opened books for first quarter orders, tonnage placements are reported substantial. The forgers are showing greater interest, and heavy equipment builders are said to be specifying freely. Automotive demand is improved, but it still falls short of expectations. In a number of cases buyers say they are still awaiting shipments that had been originally scheduled for August delivery.

Cold-finished bars continue to move sluggishly. Some converters continue to take in all the hot bar stock allocated them, but several in the Pittsburgh area did not take their full quotas this quarter.

Absence of heavy buying by the auto industry is seen as the chief cause for the lag in this area of the bar market.

Structural Shapes . . .

Structural Shape Prices, Page 169

Despite extended deliveries, considerable construction is being figured. There are numerous bridge projects and a good assortment of other building, including office structures, apartments, schools and other public work before fabricators over the nation.

On large jobs, structural steel delivery promises run 12 to 15 months, in some cases longer. One large fabricator in the New York area is booked up to 22 months. But this interest can work some rela-

Production line D-C welder?
Is there any other?

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tively small jobs into its schedules. Deliveries on small projects from the smaller fabricating shops extend six to seven months.

Buying in the East is reported light. There are few outstanding orders. Much tonnage is being figured, and area fabricators' order books are well extended. New England fabricators are getting more steel, but they are not fully covered on contracts booked recently. This results in less estimating on new work.

Plates . . .

Plate Prices, Page 169

Deliveries of light plates and floor plates are improving, say large buyers in the Pittsburgh market. But mill quotas remain slim, and there is little change in the supply of heavy plates.

Construction firms expect to receive larger tonnage from the mills in November and December. No particular easing in over-all supply conditions is indicated for the months ahead. In fact, first quarter requirements for highway and railroad car construction are likely to increase the pressure on the market.

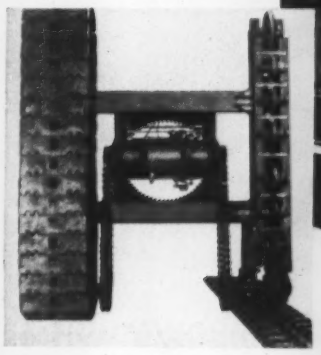
Most producers do not anticipate a heavy carry-over at the end of this quarter. They have been moving cautiously in accepting new orders. One large mill only recently opened its order books for December tonnage, seeking to keep commitments as much in balance with supply as possible.

In opening for first quarter orders last week, a leading mill estimated that at the end of December it would have two to three weeks' carry-over on light plates and four weeks on heavy. This isn't bad considering the great pressure for plates.

On the West Coast, sellers continue to quote 90 to 120-day delivery. More consumers are turning to eastern mills and the warehouses for supplies. Little relief is in prospect in either quarter.

No projects involving sizable tonnages are up for bidding in the Pacific Northwest, but several important jobs will come out soon. Plates will be required for a refinery in Alaska, while General Petroleum Co. plans to enlarge its refinery at Ferndale, Wash.

This Heavy-Duty 22-B with 50-ft. boom and 20-ft. jib loads drums of enamel onto a barge for a company in Follansbee, West Virginia.



Heavy-Duty mounting is available with flat or tapered ends and 26-, 30-, or 36-in. treads.

Heavy-Duty 22-B Cuts Handling Costs

For material handling jobs around your plant, the Bucyrus-Erie Heavy-Duty 22-B crawler crane offers many money saving advantages.

Long-frame crawler mounting and low center of gravity provide great stability . . . make lifting of heavier loads possible. Extra-sturdy construction extends all the way up the boom, which is readily extended to 70-ft. length by using removable inserts. Additional 10-, 20-, or 30-ft. jibs also help you build your stockpiles higher. Four-way safety power controlled lowering for boom hoist plus independent control lets you inch heaviest loads into position. Propelling speeds provide for efficient moving. Fast moves can be made with the selective high propel speed; normal moves with low speed propel.

These features and many others add up to more efficient yard operation . . . less overhead. For more information, contact your nearby Bucyrus-Erie distributor soon. 248E56

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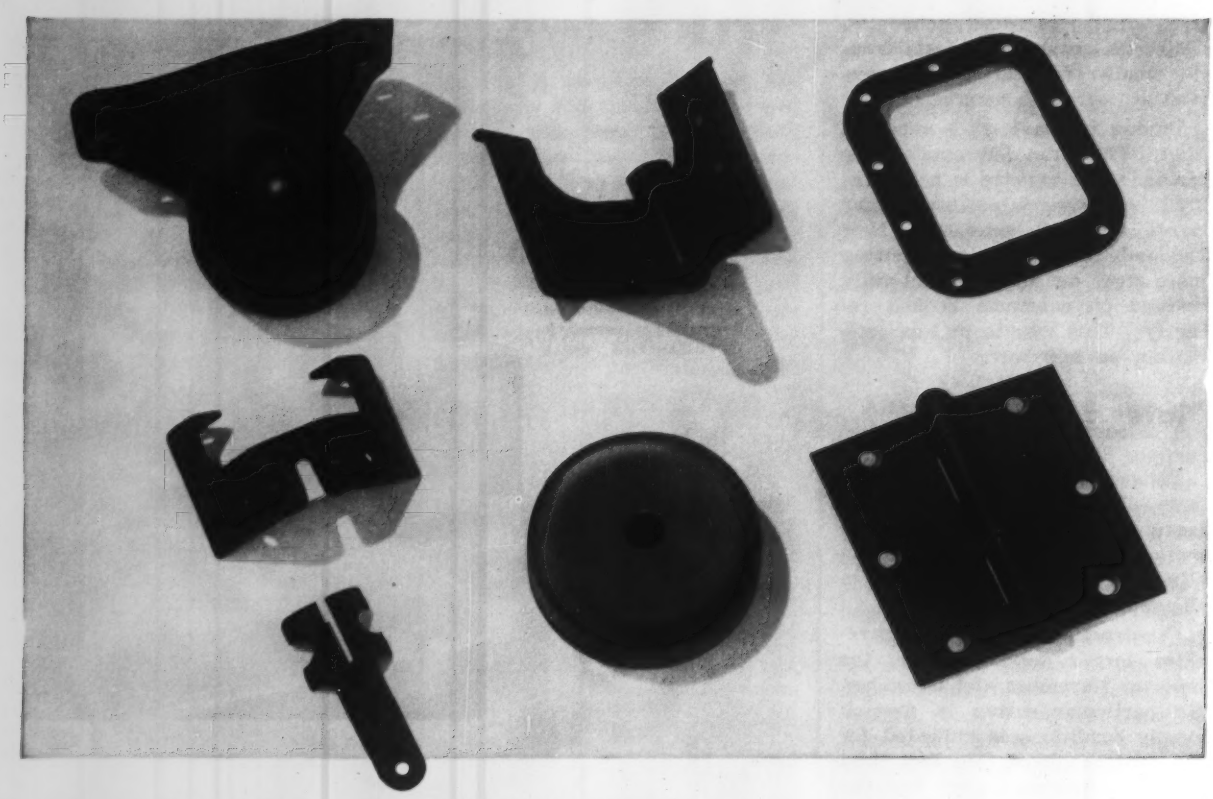
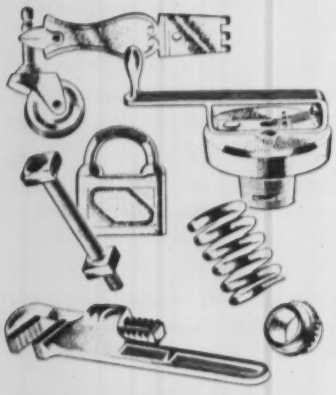
SOUTH MILWAUKEE WISCONSIN



A manufacturer of metal stampings* writes:

"There are many outfits offering something like Parkerizing, but we want the real thing."



Some typical parts which are protected from rust by treatment with Parco Compound

Parco Compound† (Parkerizing†) is the original rust-resistant phosphate coating for iron and steel. For forty-two years it has protected hundreds of different types of products—from bolts to boats.

There are other products "like" Parkerizing, but none quite so effective, so dependable, so thoroughly tested and proven.

Parkerizing is simple, fast, and costs very little. It can be used on any iron or steel article which can be immersed in the tanks. Since it does not change the dimensions of the treated parts, it is excellent for threaded or close-fitting components. Parts treated with Parco Compound may be finished with stains, waxes, oils or paint.

You, too, should demand "the real thing." Use Parkerizing for rust resistance.

**Name on request.*

†Parkerizing, Parco—Reg. U.S. Pat. Off.

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corrosion resistant paint base	aids in cold forming of metals	rust resistant	wear resistant for friction surfaces	heavy duty maintenance paints since 1883

About 200 tons of Belgian piling will be imported for the Aurora avenue underpass in Seattle. This is 18 per cent of the total tonnage needed, the remainder going to the Bethlehem Pacific Coast Steel Corp. Local steelworkers are protesting the use of foreign steel.

Sun Shipbuilding & Dry Dock Corp., Chester, Pa., has booked orders for two tankers and is reported to be figuring on three more.

Stainless Steel . . .

Stainless Steel Prices, Page 175

On Oct. 24, Sharon Steel Corp. began operating new facilities for the production of stainless at its Dearborn Division, Dearborn, Mich. They increase the company's stainless capacity by 25 per cent.

The operation takes Sharon's stainless closer to its market. It is a major supplier to the automotive and household appliance industries. Stainless now can be shipped from the company's Roemer Works at Farrell, Pa., in a breakdown size rolled to finished gage, and delivered from the Dearborn Works.

New facilities include pickling, annealing, polishing, roll grinding, and slitting machinery.

Sharon has announced plans for the installation of a $6,150,000 electric furnace shop at its Roemer Works which will double the company's output of stainless.

Strike Cuts Steel Shipments

Shipments of finished steel products totaled 53,821,525 net tons in the first eight months this year, reports the American Iron & Steel Institute.

Despite the mid-summer strike of the steelworkers in July and early August the eight-month total was only about 1.5 million tons short of the 55,294,356 tons moved in the comparable period of 1955.

In July, shipments amounted to 1,288,988 tons. The total rose to 5,539,915 tons in August. Comparable figures for July and August, 1955, are 6,250,597 tons and 7,053,615 tons.

Steel Product Shipments, July-August, 1956

(Net Tons; all grades)

Products	July-August 1956 Combined Tonnage: Carbon	Alloy	Stainless	Year to Date: 1956	1955
Ingots	33,663	20,369	1,733	460,380	378,115
Blooms, slabs, etc.	114,994	45,805	2,012	1,486,015	1,853,325
Tube rounds	240	362	....	10,602	NA
Skelp	12,051	.....	....	113,324	114,776
Wire rods	58,671	920	265	694,873	757,791
Shapes (heavy)	434,314	4,505	....	3,261,836	3,006,173
Steel piling	32,883	26	....	246,435	246,662
Plates	597,394	29,254	4,254	4,790,751	4,219,736
Rails (standard)	53,204	.....	....	724,690	829,354
Rails (all other)	13,313	.....	....	66,792	51,125
Joint bars	6,045	.....	....	56,508	48,186
Tie plates	19,110	.....	....	203,648	216,804
Track spikes	6,681	.....	....	70,604	65,364
Wheels	39,380	41	....	225,774	192,451
Axles	14,368	37	....	108,132	71,862
Bars (hot-rolled)	508,650	129,470	7,343	5,628,231	5,653,426
Bars (reinforcing)	237,614	.....	....	1,544,621	1,388,150
Bars (cold-drawn)	121,912	24,345	5,905	1,191,620	1,208,506
Tool steel	2,004	14,390	....	87,089	73,624
Standard pipe	227,769	1	....	1,869,074	1,941,245
Oil country goods	187,329	17,695	....	1,684,445	1,634,659
Line pipe	286,252	.....	....	2,150,421	1,986,195
Mechanical tubing	67,847	31,184	545	645,547	617,411
Pressure tubing	31,045	6,323	1,316	236,026	175,300
Wire—drawn	244,037	4,517	2,245	1,994,390	2,076,215
Nails & staples	53,969	.....	....	385,828	464,913
Barbed wire	5,205	.....	....	60,495	96,813
Woven fence	24,009	.....	....	208,838	247,676
Bale ties	4,620	.....	....	41,817	49,975
Black plate	53,961	.....	....	511,900	528,636
Tin plate—HD	81,005	.....	....	646,381	799,480
Tin plate—electro	408,903	.....	....	3,188,725	3,278,633
Sheets—hot-rolled	685,563	17,407	5,590	5,614,174	6,154,269
Sheets—cold-rolled	1,077,604	3,573	19,114	8,744,079	9,739,676
Sheets—galvanized	276,048	.....	....	1,928,253	1,818,135
Sheets—other coated	22,480	.....	....	159,752	175,100
Sheets—enameling	Not available. Included in Cold-Rolled Sheets				141,111
Electrical sheets and strip	6,581	72,872	....	534,907	514,871
Strip—hot-rolled	139,854	2,271	100	1,170,886	1,374,967
Strip—cold-rolled	141,096	2,031	19,415	1,073,662	1,103,646
Total (1956)	6,331,668	427,398	69,837	53,821,525	55,294,356

NA—Not available.
Data from American Iron & Steel Institute.

Wire . . .

Wire Prices, Pages 171 & 172

Wire rods are in relatively tight supply, but most wire products through the merchants' and manufacturers' ranges are readily available. In fact, wire demand in general has been disappointing this fall.

Mill schedules for late fourth quarter are filling slowly and unevenly. In some grades, notably heading and spring wire, this is due to spotty demand for automotive components, including small fasteners. In New England, a slight bulge in orders for the new autos has subsided.

Demand for heavier sizes in low carbon grades for reinforcing is off seasonally, enabling some producers to make headway against substantial order backlogs.

Youngstown Sheet & Tube Co. and Atlantic Steel Co. announce revisions in prices in their merchant product schedules similar to those made recently by other producers. They primarily involve a change in billing procedure.

Tubular Goods . . .

Tubular Goods Prices, Page 175

Leading producers of tubular goods expect to operate at full capacity the remainder of this year and the first quarter of next year. A leading maker of oil country tubing at Pittsburgh reports its first quarter order books are 90 per cent filled.

The mills are under pressure to increase production of high alloy tubing. With oil wells being drilled deeper, a critical shortage of this product may develop next year, say some trade interests.

Youngstown Sheet & Tube Co., Youngstown, reports orders for pipe and other tubular goods are especially heavy.

A 600-mile 14-in. pipeline to Los Angeles from oil reserves in the area where Utah, Arizona, New Mexico and Colorado intersect, is planned by Standard Oil Co. of California and Shell Oil Co. A petroleum products line from Salt Lake City, Utah, to Spokane, also is under consideration by Service Pipe Line Corp., Continental Pipe Line Co., Sinclair Pipe Line Corp., and Phillips Petroleum Co.

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KIRK & BLUM DOWN DRAFT DUST CONTROL

Warehouse . . .

Warehouse Prices, Page 176

Demand for warehouse steel products is brisk. Distributors are able to meet inquiry fully for most standard items. The improved supply situation is due primarily to heavier receipts from the mills. A few items continue as scarce as ever, notably structural shapes, plates and, in some districts, certain grades of sheets.

Supplies of galvanized and cold-finished sheet are ample in most districts, while hot-rolled sheet supplies are tighter. There have been offerings of extra sheet tonnage for November delivery, despite increasing rumors of heavier automotive demand for sheet that month.

Tin mill items and large hot-rolled bars are in short supply. Some shipments are being delayed by a scarcity of railroad cars.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

230 tons, warehouse, Van Sciver Co., Jenkintown, Pa., to Robinson Steel Co., Philadelphia.

130 tons, power plant addition, Tacoma, Wash., to Screw Machine Products Co., Portland, Oreg.

100 tons, 26 small bridge spans for Alaska Bureau of Public Works, to Bethlehem Pacific Coast Steel Corp., Seattle; Pacific-Alaska Contractors, Tacoma, Wash., general contractor.

100 tons, Washington state highway bridge, Klickitat county, to West Coast Steel Works, Portland, Oreg.

100 tons, including bars, state highway bridge, Roxbury, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; DeFonce Construction Co., Bridgeport, Conn., general contractor.

STRUCTURAL STEEL PENDING

5500 tons, steel sheet piling, Corps of Engineers, Louisville, direct.

3300 tons, state thruway bridge over the Byram river, Westchester county, New York; bids Nov. 15.

3500 tons, Pratt & Whitney plant, Miami, Fla.; bids closed.

2100 tons, bridge superstructure, Merrimack river, Metheum, Mass., West End Iron Works, Cambridge, Mass., low; bids direct, state department of public works, Boston.

PLATES . . .

PLATES PLACED

200 tons, sheet steel piling, Aurora avenue underpass, to Belgian producer; Butler Construction & Engineering Co., Seattle, general contractor.

100 tons, elevated water tank, veterans hospital, Sunmount, N. Y., to Hammond Iron Works, Warren, Pa.

PLATES PENDING

135 tons, one-half alloy, direct to contracting officer, Rock Island arsenal, Ill.

RAILS, CARS . . .

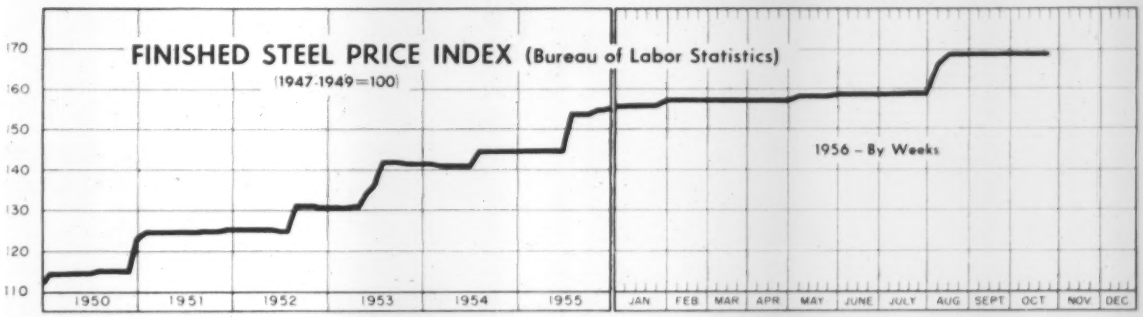
LOCOMOTIVES PLACED

National Railways of Mexico, ten diesel-electric units, to General Electric Co., Schenectady, N.Y.

RAILS PENDING

1030 tons, 115-lb rail, S. P. & S. Railway, track relocation, incident to Ice Harbor dam reservoir project; bids to U.S. Engineer, Walla Walla, Wash., Oct. 24.

Price Index and Composites



Oct. 23, 1956	Week Ago	Month Ago	Oct. Avg.	Year Ago
168.6	168.6	168.6	168.6	154.5

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Oct. 23

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.150	Bars, Reinforcing	5.738
Rails, Light, 40 lb	6.567	Bars, C.F., Carbon	9.610
Tie Plates	6.025	Bars, C.F., Alloy	13.275
Axles, Railway	8.950	Bars, C.F., Stainless, 302 (lb)	0.508
Wheels, Freight Car, 33 in. (per wheel)	57.50	Sheets, H.R., Carbon	5.695
Plates, Carbon	5.550	Sheets, C.R., Carbon	6.639
Structural Shapes	5.267	Sheets, Galvanized	8.220
Bars, Tool Steel, Carbon (lb)	0.480	Sheets, C.R., Stainless, 302 (lb)	0.635
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.585	Sheets, Electrical	11.225
Bars, Tool Steel, H. R. Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274	Strip, C.R., Carbon	8.843
Bars, Tool Steel, H.R., Alloy, High Speed W18 Cr 4, V 1 (lb)	1.769	Strip, C.R., Stainless, 403 (lb)	0.475
Bars, H.R., Alloy	10.025	Strip, H.R., Carbon	5.900
Bars, H.R., Stainless, 303 (lb)	0.483	Pipe, Black, Buttweld (100 ft)	18.376
Bars, H.R., Carbon	5.925	Pipe, Galv., Buttweld (100 ft)	22.516
		Pipe, Line (100 ft)	182.860
		Casing, Oil Well, Carbon (100 ft)	178.046
		Casing, Oil Well, Alloy (100 ft)	276.870
		Tubes, Boiler (100 ft)	45.033
		Tubing, Mechanical, Carbon (100 ft)	22.973
		Tubing, Mechanical, Stainless, 304 (100 ft)	187.133
		Tin Plate, Hot-dipped, 1.25 lb.	9.333
		Tin Plate, Electrolytic, 0.25 lb	8.033
		Black Plate, Canmaking Quality	7.133
		Wire, Drawn, Carbon	9.175
		Wire, Drawn, Stainless, 430 (lb)	0.630
		Bale ties (bundle)	7.213
		Nails, Wire, 8d Common	9.368
		Wire, Barbed (80-rod spool)	8.412
		Woven Wire Fence (20-rod roll)	20.505

STEEL's FINISHED STEEL PRICE INDEX*

	Oct. 24 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	225.58	225.58	225.71	208.90	171.92
Index in cents per lb	6.111	6.111	6.114	5.661	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$137.48	$137.48	$137.75	$128.14	$106.32
No. 2 Fdry Pig Iron, GT	62.63	62.63	62.63	58.99	52.54
Basic Pig Iron, GT	62.18	62.18	62.18	58.49	52.16
Malleable Pig Iron, GT	63.41	63.41	63.41	59.77	53.27
Steelmaking Scrap, GT	57.00	56.67	58.17	45.00	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Oct. 24 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R., deld., Philadelphia	4.93	4.93	4.93	4.90	4.223
Bars, C.F., Pittsburgh	6.85*	6.85*	6.85*	5.90	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.00	5.00	5.00	4.88	3.918
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.80	4.15
Plates, Sparrow Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.35	5.35	5.35	4.50	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.35	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.25	4.85-5.10
Nails, Wire, Pittsburgh	8.20	8.20	8.35	7.60	5.90-6.20
Tin plate (1.50 lb.),box,Pitts.	$9.85	$9.85	$9.85	$9.45	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL

Billets forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, ½-⅝" Pitts.	5.80	5.80	5.80	5.025	4.10-4.30

PIG IRON, Gross Ton

	Oct. 24 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$63.50	$63.50	$63.50	$59.50	$53.00
Basic, Valley	62.50	62.50	62.50	58.50	52.00
Basic, deld. Phila.	66.26	66.26	66.26	62.16	56.61
No. 2 Fdry, NevilleIsland,Pa.	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, Chicago	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, deld. Phila.	66.76	66.76	66.76	62.66	57.11
No. 2 Fdry, Birm.	59.00	59.00	59.00	55.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	66.70	66.70	66.70	62.70	56.49
Malleable, Valley	63.00	63.00	63.00	59.00	52.50
Malleable, Chicago	63.00	63.00	63.00	59.00	52.50
Ferromanganese, Duquesne	235.00†	235.00†	215.00†	190.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$55.50	$55.50	$56.50	$44.50	$44.00
No. 1 Heavy Melt, E. Pa.	57.50	56.50	58.00	46.50	42.50
No. 1 Heavy Melt, Chicago	58.00	58.00	60.00	44.00	42.50
No. 1 Heavy Melt, Valley	63.50	63.50	65.50	48.00	44.00
No. 1 Heavy Melt, Cleve.	61.50	61.50	63.00	45.50	43.00
No. 1 Heavy Melt, Buffalo	57.50	57.50	57.50	38.50	43.00
Rails, Rerolling, Chicago	84.00	84.00	84.50	65.50	52.50
No. 1 Cast, Chicago	50.50	50.50	53.50	47.50	49.00

COKE, Net Ton

Beehive, Furn, Connlsvl.	$14.50	$14.50	$14.50	$13.625	$14.75
Beehive, Fdry, Connlsvl.	17.50	17.50	17.50	16.50	17.50

Protect your plant with the same Ansul extinguishers that guard this big steel mill

Well-planned safety and fire prevention programs are doing their share to protect lives, property and production schedules at the Great Lakes Corporation, Detroit, Mich., division of National Steel Corporation. Ansul fire extinguishers are playing a part in this successful program.

Your safety program deserves the best in fire protection. Remember, fire doesn't give you a second chance. Here are three big reasons why Ansul dry chemical extinguishers can take the worry out of your fire protection program and help you maintain a safety record to be proud of:

First. Ansul extinguishers are *dependable.* They are always ready for action, even under severe exposure conditions. Weather-tight construction assures this dependability. *Second.* Ansul extinguishers are *effective.* Patented nozzles deliver either a straight or fan stream, depending upon the hazard. This is an Ansul exclusive for more effective fire control. *Third.* Ansul extinguishers are backed by a *five-year warranty.* This is the best way we know of saying that Ansul extinguishers are the finest of their kind made anywhere. No other manufacturer offers this important warranty.

Get in touch with your local ANSUL MAN through the yellow pages of your phone directory, or write direct to ANSUL CHEMICAL COMPANY, DEPT. S-10, MARINETTE, WISCONSIN.

ANSUL

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers page 170; to footnotes, page 172.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$70.50

INGOTS, Alloy (NT)
Detroit R7 .....$74.00
Houston S5 .....74.00
Midland,Pa. C18 .....74.00
Munhall,Pa. U5 .....74.00

BILLETS, BLOOMS & SLABS Carbon, Forging (NT)
Aliquippa,Pa. J5 ....$74.00
Bessemer,Pa. U5 .....74.00
Bridgeport,Conn. N19..79.00
Buffalo R2 .....74.00
Clairton,Pa. U5 .....74.00
Ensley,Ala. T2 .....74.00
Fairfield,Ala. T2 .....74.00
Fontana,Calif. K1 ....83.50
Gary,Ind. U5 .....74.00
Johnstown,Pa. B2 ....74.00
Lackawanna,N.Y. B2..74.00
LoneStar,Tex. L6 .....80.00
Munhall,Pa. U5 .....74.00
Pittsburgh J5 .....74.00
S.Chicago,Ill. R2, U5..74.00
S.Duquesne,Pa. U5 ....74.00
Sterling,Ill. N15 .....74.00
Youngstown R2 .....74.00

Carbon, Forging (NT)
Aliquippa,Pa. J5 ....$91.50
Bessemer,Pa. U5 .....91.50
Bridgeport,Conn. N19 ..96.50
Buffalo R2 .....91.50
Canton,O. R2 .....94.00
Clairton,Pa. U5 .....91.50
Conshohocken,Pa. A3 ..96.50
Ensley,Ala. T2 .....91.50
Fairfield,Ala. T2 .....91.50
Fontana,Calif. K1....101.00
Gary,Ind. U5 .....91.50
Geneva,Utah C11 ....91.50
Houston S5 .....96.50
Johnstown,Pa. B2 ....91.50
Lackawanna,N.Y. B2..91.50
LosAngeles B3 .....101.00
Midland,Pa. C18 .....91.50
Munhall,Pa. U5 .....91.50
Pittsburgh J5 .....91.50
Seattle B3 .....105.00
S.Chicago R2, U5, W14 91.50
S.Duquesne,Pa. U5 ....91.50
S.SanFrancisco B3 ...101.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$107.00
Bridgeport,Conn. N19 .107.00
Buffalo R2 .....107.00
Canton,O. R2 .....107.00
Conshohocken,Pa. A3 .114.00
Detroit R7 .....107.00
Fontana,Calif. K1 ....128.00
Gary,Ind. U5 .....107.00
Houston S5 .....112.00
Ind.Harbor,Ind. Y1 ..107.00
Johnstown,Pa. B2 ....107.00
Lackawanna,N.Y. B2 .107.00
LosAngeles B3 .....127.00
Massillon,O. R2 .....107.00
Midland,Pa. C18 ....107.00
Munhall,Pa. U5 .....107.00
S.Chicago R2,U5,W14 .107.00
S.Duquesne,Pa. U5 ..107.00
Struthers,O. Y1 .....107.00
Warren,O. C17 .....107.00

ROUNDS, SEAMLESS TUBE (NT)
Bridgeport,Conn. N19 $116.50
Buffalo R2 .....111.50
Canton,O. R2 .....114.00
Cleveland R2 .....111.50
Gary,Ind. U5 .....111.50
S.Chicago,Ill. R2, W14 111.50
S.Duquesne,Pa. U5 ..111.50

SKELP
Aliquippa,Pa. J5 ....4.725
LoneStar,Tex. L6 ....5.025
Munhall,Pa. U5 .....4.625
SparrowsPoint,Md. B2 .4.625
Warren,O. R2 .....4.625
Youngstown R2, U5 ..4.625

WIRE RODS
AlabamaCity,Ala. R2 ..5.80
Aliquippa,Pa. J5 .....5.80
Alton,Ill. L1 .....6.00
Buffalo W12 .....5.80
Cleveland A7 .....5.80
Donora,Pa. A7 .....5.80
Fairfield,Ala. T2 .....5.80
Houston S5 .....6.05
IndianaHarbor,Ind. Y1 .5.80
Johnstown,Pa. B2 .....5.80
Joliet,Ill. A7 .....5.80
KansasCity,Mo. S5 ....6.05
Kokomo,Ind. C16 .....5.90
LosAngeles B3 .....6.60
Minnequa,Colo. C10 ...6.05
Monessen,Pa. P7 .....5.80
N.Tonawanda,N.Y. B11.5.80
Pittsburg,Calif. C11 ....6.45
Portsmouth,O. P12 ....5.80
Roebling,N.J. R5 .....5.90
S.Chicago,Ill. R2 .....5.80
SparrowsPoint,Md. B2..5.90
Sterling,Ill.(1) N15 ....5.80
Sterling,Ill. N15 .....5.90
Struthers,O. Y1 .....5.80
Worcester,Mass. A7 ....6.10

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 .....5.00
Aliquippa,Pa. J5 .....5.00
Bessemer,Ala. T2 .....5.00
Bethlehem,Pa. B2 .....5.05
Birmingham C15 .....5.30
Clairton,Pa. U5 .....5.00
Fairfield,Ala. T2 .....5.00
Fontana,Calif. K1 ....5.70
Gary,Ind. U5 .....5.00
Geneva,Utah C11 .....5.00
Houston S5 .....5.10
Ind.Harbor,Ind. I-2 ....5.00
Johnstown,Pa. B2 ....5.05
KansasCity,Mo. S5 ....5.10
Lackawanna,N.Y. B2 ...5.05
LosAngeles B3 .....5.70
Minnequa,Colo. C10 ....5.30
Munhall,Pa. U5 .....5.00
Niles,Calif. P1 .....5.75
Phoenixville,Pa. P4 ....5.85
Portland,Oreg. O4 .....5.80
Seattle B3 .....5.75
S.Chicago,Ill. U5, W14 ..5.00
S.SanFrancisco B3 ....5.65
Sterling,Ill. N15 .....5.00
Torrance,Calif. C11 ....5.70
Weirton,W.Va. W6 ....5.00

Wide Flange
Bethlehem,Pa. B2 .....5.05
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 ....5.85
IndianaHarbor,Ind. I-2..5.00
Lackawanna,N.Y. B2 ..5.05
Munhall,Pa. U5 .....5.00
Phoenixville,Pa. P4 ....5.85
S.Chicago,Ill. U5 .....5.00

Alloy Std. Shapes
Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston S5 .....6.30
Munhall,Pa. U5 .....6.20
S.Chicago,Ill. U5 .....6.20

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 .....7.35
Bessemer,Ala. T2 .....7.35
Bethlehem,Pa. B2 .....7.40
Clairton,Pa. U5 .....7.35
Fairfield,Ala. T2 .....7.35
Fontana,Calif. K1 ....8.05
Gary,Ind. U5 .....7.35
Geneva,Utah C11 .....7.35
Houston S5 .....7.45
Ind.Harbor,Ind. I-2, Y1 7.35
Johnstown,Pa. B2 ....7.40
KansasCity,Mo. S5 ....7.45
Lackawanna,N.Y. B2 ..7.40
LosAngeles B3 .....8.05
Munhall,Pa. U5 .....7.35
Seattle B3 .....8.10
S.Chicago,Ill. U5, W14..7.35
S.SanFrancisco B3 ....8.00
Struthers,O. Y1 .....7.35

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....7.40
Ind.Harbor,Ind. I-2 ...7.35
Lackawanna,N.Y. B2 ..7.40
Munhall,Pa. U5 .....7.35
S.Chicago,Ill. U5 .....7.35

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.05
Lackawanna,N.Y. B2 ..5.05
Munhall,Pa. U5 .....5.00
S.Chicago,Ill. U5 .....5.00

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ...5.90
Lackawanna,N.Y. B2 ..5.90
Munhall,Pa. U5 .....5.90
S.Chicago,Ill. U5 .....5.90

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 .....4.85
Aliquippa,Pa. J5 .....4.85
Ashland,Ky. (15) A10..4.85
Bessemer,Ala. T2 .....4.85
Bridgeport,Conn. N19 ..4.75
Clairton,Pa. U5 .....4.85
Claymont,Del. C22 ....5.35
Cleveland J5, R2 .....4.95
Coatesville,Pa. L7 ....5.25
Conshohocken,Pa. A3 ..4.90
Detroit M1 .....4.60
Ecorse,Mich. G5 .....4.95
Fairfield,Ala. T2 .....4.85
Fontana,Calif.(30) K1 .5.55
Gary,Ind. U5 .....4.85
Geneva,Utah C11 .....4.85
GraniteCity,Ill. G4 ....5.05
Harrisburg,Pa. P4 ....5.80
Houston S5 .....4.95
Ind.Harbor,Ind. I-2, Y1.4.85
Johnstown,Pa. B2 .....4.85
Lackawanna,N.Y. B2 ..4.85
LoneStar,Tex. L6 .....5.20
Minnequa,Colo. C10 ....5.70
Munhall,Pa. U5 .....4.85
Newport,Ky. N9 .....4.85
Pittsburgh J5 .....4.85
Riverdale,Ill. A1 .....4.85
Seattle B3 .....5.75
Sharon,Pa. S3 .....4.85
S.Chicago,Ill. U5, W14 ..4.85
SparrowsPoint,Md. B2 ..4.85
Steubenville,O. W10 ....4.85
Warren,O. R2 .....4.85
Weirton,W.Va. W6 .....4.85
Youngstown R2, U5, Y1 4.85

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....6.20
Fontana,Calif. K1 .....6.70
Geneva,Utah C11 .....6.00
Johnstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron
Economy,Pa. B14 ....11.128

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....7.25
Bessemer,Ala. T2 .....7.25
Clairton,Pa. U5 .....7.25
Claymont,Del. C22 .....7.55
Cleveland J5, R2 .....7.25
Coatesville,Pa. L7 .....7.55
Conshohocken,Pa. A3 ..7.25
Ecorse,Mich. G5 .....7.35
Fairfield,Ala. T2 .....7.25
Fontana,Calif.(30) K1 .7.95
Gary,Ind. U5 .....7.25
Geneva,Utah C11 .....7.25
Houston S5 .....7.35
Ind.Harbor,Ind. I-2, Y1 7.25
Johnstown,Pa. B2 .....7.25
Munhall,Pa. U5 .....7.25
Pittsburgh J5 .....7.25
Seattle B3 .....8.15
Sharon,Pa. S3 .....7.25
S.Chicago,Ill. U5, W14 ..7.25
SparrowsPoint,Md. B2 ..7.25
Warren,O. R2 .....7.25
Youngstown U5, Y1 ....7.25

PLATES, Alloy
Bridgeport,Conn. N19 ..6.55
Claymont,Del. C22 ....6.85
Coatesville,Pa. L7 ....6.85
Fontana,Calif.(30) K1 ..7.55
Gary,Ind. U5 .....6.85
Houston S5 .....6.95
Ind.Harbor,Ind. Y1 ...6.85
Johnstown,Pa. B2 .....6.85
Munhall,Pa. U5 .....6.85
Newport,Ky. N9 .....6.85
Seattle B3 .....7.75
Sharon,Pa. S3 .....6.85
S.Chicago,Ill. U5, W14 ..6.85
SparrowsPoint,Md. B2 ..6.85
Youngstown Y1 .....6.85

FLOOR PLATES
Cleveland J5 .....5.925
Conshohocken,Pa. A3 ..5.925
Harrisburg,Pa. P4 .....6.275
Ind.Harbor,Ind. I-2 ..5.925
Munhall,Pa. U5 .....5.925
S.Chicago,Ill. U5 .....5.925

PLATES, Ingot Iron
Ashland c.l. (15) A10 ..5.10
Ashland l.c.l. (15) A10..5.60
Cleveland c.l. R2 .....5.60
Warren,O. c.l. R2 .....5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.075
Aliquippa,Pa.(9) J5 ..5.075
Alton,Ill. L1 .....5.275
Atlanta(9) A11 .....5.575
Bessemer,Ala.(9) T2 ..5.075
Birmingham(9) C15 ...5.375
Bridgeport,Conn. N19 ..5.30
Buffalo(9) R2 .....5.075
Clairton,Pa. U5 .....5.075
Cleveland(9) R2 .....5.075
Ecorse,Mich.(9) G5 ...5.175
Emeryville,Calif. J7 ....5.85
Fairfield,Ala.(9) T2 ..5.075
Fairless,Pa.(9) U5 ...5.225
Fontana,Calif.(9) K1 ..5.775
Gary,Ind.(9) U5 .....5.075
Geneva,Utah(9) C11 ...5.157
Houston(9) S5 .....5.325
Ind.Harbor(9) I-2, Y1 ..5.075
Johnstown,Pa.(9) B2 ..5.075
Joliet,Ill. P22 .....5.575
KansasCity,Mo.(9) S5 ..5.325
Lackawanna(9) B2 .....5.075
LosAngeles(9) B3 .....5.775
Midland,Pa.(9) C18 ...5.425
Milton,Pa.(23) M18 ...5.425
Minnequa,Colo. C10 ...5.525
Niles,Calif. P1 .....5.85
N.T'wanda,N.Y.(9)B11 5.075
Pittsburg,Calif.(9) C11.5.775
Pittsburgh(9) J5 .....5.075
Portland,Oreg. O4 .....5.85
Seattle B3, N14 .....5.825
S.Ch'e'go(9) R2,U5,W14 5.075
S.Duquesne,Pa.(9) U5 ..5.075
S.SanFran.,Calif.(9) B3 5.825
Sterling,Ill.(1) N15 ...5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Torrance,Calif.(9) C11..5.775
Weirton,W.Va.(9)W6 ..5.075
Youngstown(9) R2, U5 5.075

BARS, H.R. Loaded Alloy (Including leaded extra)
Warren,O. C17 .....7.125

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....6.125
Bridgeport,Conn. N19 ..6.20
Buffalo R2 .....6.125
Canton,O. R2 .....6.125
Clairton,Pa. U5 .....6.125
Detroit R7 .....6.225
Ecorse,Mich. G5 .....6.225
Fairless,Pa. U5 .....6.275
Fontana,Calif. K1 ....7.175
Gary,Ind. U5 .....6.125
Houston S5 .....6.375
Ind.Harbor,Ind. I-2,Y1 6.125
Johnstown,Pa. B2 .....6.125
KansasCity,Mo. S5 ....6.375
Lackawanna,N.Y. B2 ..6.125
LosAngeles B3 .....7.175
Massillon,O. R2 .....6.125
Midland,Pa. C18 .....6.125
S.Chicago R2, U5, W14 6.125
S.Duquesne,Pa. U5 ....6.125
Struthers,O. Y1 .....6.125
Warren,O. C17 .....6.125
Youngstown U5 .....6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy
Aliquippa,Pa. J5 ....7.425
Bessemer,Ala. T2 ....7.425
Bethlehem,Pa. B2 .....7.425
Bridgeport,Conn. N19 ..7.50
Clairton,Pa. U5 .....7.425
Cleveland R2 .....7.425
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.425
Fontana,Calif. K1 .....8.125
Gary,Ind. U5 .....7.425
Houston S5 .....7.675
Ind.Harbor,Ind. Y1 ...7.425
Johnstown,Pa. B2 .....7.425
KansasCity,Mo. S5 ....7.675
Lackawanna,N.Y. B2 ..7.425
LosAngeles B3 .....8.125
Pittsburgh J5 .....7.425
Seattle B3 .....8.175
S.Chicago,Ill. U5, W14 7.425
S.Duquesne,Pa. U5 ....7.425
S.SanFrancisco B3 ....8.175
Struthers,O. Y1 .....7.425
Youngstown U5 .....7.425

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.225
Lackawanna(9) B2 .....5.075
Sterling,Ill. N15 .....5.175
Sterling,Ill(1) N15 ...5.075

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....5.075
Atlanta A11 .....5.575
Joliet,Ill. P22 .....5.10
Niles,Calif. P1 .....5.85
Pittsburgh J5 .....5.075
Portland,Oreg. O4 .....5.85
SanFrancisco B7 .....5.95

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston S5 .....6.45
KansasCity,Mo. S5 ....6.45
Youngstown U5 .....6.20

BARS, C.F. Loaded Alloy (Including leaded extra)
Ambridge,Pa. W18 ....9.225
Chicago W18 .....9.225
Cleveland C20 .....9.475
LosAngeles S30 .....11.10
LosAngeles P2 .....11.00
Monaca,Pa. S17 .....9.225
Newark,N.J. W18 ....9.40
Warren,O. C17 .....9.475

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....6.85
BeaverFalls,Pa. M12,R2 6.85
Bridgeport,Conn. N19 ..7.20
Buffalo B5 .....6.90
Camden,N.J. P13 .....7.30
Carnegie,Pa. C12 .....6.85
Chicago W18 .....6.85
Cleveland A7, C20 ....6.85
Detroit B5, P17 .....7.05
Detroit R7 .....6.85
Donora,Pa. A7 .....6.85
Elyria,O. W8 .....6.85
FranklinPrk,Ill. N5 ....6.85
Gary,Ind. U5 .....6.85
GreenBay,Wis. F7 .....6.85
Hammond,Ind. L2, M13 6.85
Hartford,Conn. R2 ....7.35
Harvey,Ill. B5 .....6.85
LosAngeles P2, S30 ....8.30
Manafield,Mass. B5 ....7.40
Massillon,O. R2, R8 ..6.85
Midland,Pa. C18 .....6.85
Monaca,Pa. S17 .....6.85
Newark,N.J. W18 .....6.85
NewCastle,Pa.(17) B4 ..6.85
Pittsburg J5 .....6.85
Plymouth,Mich. P5 ....7.10
Putnam,Conn. W18 ....7.40
Readville,Mass. C14 ....7.40
S.Chicago,Ill. W14 ....6.85
SpringCity,Pa. K3 ....7.30
Struthers,O. Y1 .....6.85
Waukegan,Ill. A7 .....6.85
Youngstown F3, Y1 ....6.85

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19.6.10

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....8.325
BeaverFalls,Pa. M12,R2 8.325
Bethlehem,Pa. B2 .....8.325
Bridgeport,Conn. N19 ..8.475
Buffalo B5 .....8.325
Camden,N.J. P13 .....8.50
Canton,O. T7 .....7.425
Carnegie,Pa. C12 .....8.325
Chicago W18 .....8.325
Cleveland A7, C20 ....8.325
Detroit B5, P17 .....8.525
Detroit R7 .....8.325
Donora,Pa. A7 .....8.325
Elyria,O. W8 .....8.325
FranklinPark,Ill. N5 ..8.325
Gary,Ind. R2 .....8.325
GreenBay,Wis. F7 .....8.325
Hammond,Ind. L2,M13 8.325
Hartford,Conn. R2 ....8.625
Harvey,Ill. B5 .....8.325
Lackawanna,N.Y. B2 ..8.325
LosAngeles P2, S30 ...10.10
Manafield,Mass. B5 ....8.625
Massillon,O. R2, R8 ..8.325
Midland,Pa. C18 .....8.325
Monaca,Pa. S17 .....8.325
Newark,N.J. W18 .....8.50
Plymouth,Mich. P5 ....8.525
S.Chicago W14 .....8.325
SpringCity,Pa. K3 .....8.50
Struthers,O. Y1 .....8.325
Warren,O. C17 .....8.325
Waukegan,Ill. A7 .....8.325
Worcester,Mass. A7 ..8.625
Youngstown F3, Y1 ...8.325

BARS, Reinforcing (To Fabricators)
Ala.City,Ala. R2 ....5.075
Atlanta A11 .....5.575
Birmingham C15 .....5.375
Bridgeport,Conn. N19 ..5.30
Buffalo R2 .....5.075
Cleveland R2 .....5.075
Ecorse,Mich. G5 .....5.225
Emeryville,Calif. J7 ....5.85
Fairfield,Ala. T2 .....5.075
Fairless,Pa. U5 .....5.225

Ft. Worth, Tex. (42) T4 .5.525
Gary, Ind. U5 .....5.075
Houston S5 .....5.325
Ind. Harbor, Ind. I-2, Y1 5.075
Johnstown, Pa. B2 ....5.075
Joliet, Ill. P22 .....5.575
Kansas City, Mo. S5 ...5.325
Lackawanna, N.Y. B2 ..5.075
Los Angeles B3 .....5.775
Milton, Pa. M18 .....5.225
Minnequa, Colo. C10 ..5.525
Niles, Calif. P1 .....5.85
Pittsburg, Calif. C11 ..5.775
Pittsburgh J5 .....5.075
Portland, Oreg. O4 .....5.85
Sand Springs, Okla. S5..5.575
Seattle B3, N14 .....5.825
S. Chicago, Ill. R2 .....5.075
S. Duquesne, Pa. U5 ...5.075
S. San Francisco B3 ....5.825
Sparrows Point, Md. B2.5.075
Sterling, Ill. (1) N15 ...5.075
Sterling, Ill. N15 .....5.175
Struthers, O. Y1 .....5.075
Torrance, Calif. C11 ..5.775
Youngstown R2, U5 ..5.075

BARS, Reinforcing (Fabricated; to Consumers)

Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown, Pa. ¼-1" B2..6.73
Kansas City, Kans. S5 ..6.825
Marion, O. P11 .....6.70
New York U8 .....7.18
Pittsburgh U8 .....6.75
Seattle B3, N14 .....7.20
Sparrows Pt. ¼-1" B2 ..6.73
Williamsport, Pa. S19 ..6.65

RAIL STEEL BARS

Chicago Hts. (3) C2, I-2 .5.075
Chicago Hts. (4) I-2 ....5.075
Chicago Hts. (4) C2 .....5.65
Ft. Worth, Tex. (26) T4 ..5.525
Franklin, Pa. (4) F5 ....5.60
Franklin, Pa. (3) F5 ....5.10
Jersey Shore, Pa. (4) J8 ..5.00
Marion, O. (3) P11 ....5.15
Moline, Ill. (3) R2 ....5.225
Tonawanda (3) B12 ....5.65
Tonawanda (4) B12 ....6.15
Williamsport, Pa. (3) S19..5.65

BARS, Wrought Iron

Economy, Pa. (S.R.) B14 12.306
Economy, Pa. (D.R.) B14 15.301
Economy (Staybolt) B14 15.676
McK. Rks. (S.R.) L5 ..13.15
McK. Rks. (D.R.) L5 ..18.00
McK. Rks. (Staybolt) L5 19.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala. City, Ala. R2 .....4.675
Allenport, Pa. P7 .....4.675
Ashland, Ky. (8) A10 ..4.675
Cleveland J5, R2 ....4.675
Conshohocken, Pa. A3..4.725
Detroit (8) M1 .....4.775
Dravosburg, Pa. U5....4.675
Ecorse, Mich. G5 .....4.775
Fairfield, Ala. T2 .....4.675
Fairless, Pa. U5 .....4.725
Fontana, Calif. K1 ....5.475
Gary, Ind. U5 .....4.675
Geneva, Utah C11 ....4.775
Granite City, Ill. (8) G4..4.875
Ind. Harbor, Ind. I-2, Y1 4.675
Lackawanna, N.Y. B2..4.675
Munhall, Pa. U5 .....4.675
Newport, Ky. (8) N9 ..4.675
Niles, O. M21 .....4.675
Pittsburg, Calif. C11 ..5.375
Pittsburgh J5 .....4.675
Portsmouth, O. P12 ....4.675
Riverdale, Ill. A1 .....4.675
Sharon, Pa. S3 .....4.675
S. Chicago, Ill. W14 ....4.675
Sparrows Point, Md. B2..4.675
Steubenville, O. W10 ..4.675
Warren, O. R2 .....4.675
Weirton, W.Va. W6 ....4.675
Youngstown U5, Y1 ..4.675

SHEETS, H.R., (19 Ga. & Lighter)

Niles, O. M21 .....5.75

SHEETS, H.R. Alloy

Dravosburg, Pa. U5 ....7.75
Gary, Ind. U5 .....7.75
Ind. Harbor, Ind. Y1 ...7.75
Newport, Ky. N9 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....6.90
Conshohocken, Pa. A3 ..6.95
Dravosburg, Pa. U5 ....6.90
Ecorse, Mich. G5 .....7.00
Fairfield, Ala. T2 .....6.90
Fairless, Pa. U5 .....6.95
Fontana, Calif. K1 ....7.70
Gary, Ind. U5 .....6.90
Ind. Harbor, Ind. I-2, Y1 6.90
Lackawanna (35) B2....6.90
Munhall, Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S. Chicago, Ill. U5 .....6.90
Sparrows Point (36) B2 ..6.90
Warren, O. R2 .....6.90
Weirton, W.Va. W6 ....6.90
Youngstown U5, Y1 ....6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland, Ky. (8) A10...4.925
Cleveland R2 .....5.425
Ind. Harbor, Ind. I-2 ....4.925
Warren, O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport, Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken, Pa. A3 ...5.80
Dravosburg, Pa. U5 ....5.75
Detroit M1 .....5.75
Ecorse, Mich. G5 .....5.85
Fairfield, Ala. T2 .....5.75
Fairless, Pa. U5 .....5.80
Follansbee, W.Va. F4 ..5.75
Fontana, Calif. K1 .....6.95
Gary, Ind. U5 .....5.75
Granite City, Ill. G4 .....5.95
Ind. Harbor, Ind. I-2, Y1 5.75
Lackawanna, N.Y. B2 ..5.75
Mansfield, O. E6 .....5.75
Middletown, O. A10 ....5.75
Newport, Ky. N9 .....5.75
Pittsburg, Calif. C11 ...6.70
Pittsburgh J5 .....5.75
Portsmouth, O. P12 ....5.75
Sparrows Point, Md. B2 .5.75
Steubenville, O. W10 ....5.75
Warren, O. R2 .....5.75
Weirton, W.Va. W6 ....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 .....8.525
Dravosburg, Pa. U5....8.525
Ecorse, Mich. G5 .....8.625
Fairless, Pa. U5 .....8.575
Fontana, Calif. K1 ....9.725
Gary, Ind. U5 .....8.525
Indiana Harbor, Ind. Y1..8.525
Lackawanna (37) B2 ..8.525
Pittsburgh J5 .....8.525
Sparrows Point (38) B2 .8.525
Warren, O. R2 .....8.525
Weirton, W.Va. W6 ....8.525
Youngstown Y1.....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown, O. A10 ....6.25
Warren, O. R2 .....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland, Ky.	A10..6.65	6.90
Canton, O.	R2 ..6.65	7.15
Dravosburg	U5 ..6.65	6.90
Fairfield	T2 ....6.65	6.90
Gary Ind	U5 ....6.65	6.90
Granite City, Ill.	G4 6.85	...
Ind. Harbor	I-2 ..6.65	6.90
Kokomo, Ind.	C16..6.75	...
Martins Fry.	W10..6.65	...
Pitts., Calif.	C11..7.40	...
Sparrows Pt.	B2..6.65	...

SHEETS, Culvert—Pure Iron

Dravosburg, Pa. U5 ....6.90
Gary, Ind. U5 .....6.90
Ind. Harbor, Ind. I-2 ....6.90
Martins Fry., O. W10....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala. City, Ala. R2 .....6.30‡
Ashland, Ky. A10 .....6.30†
Canton, O. R2 .....6.30‡
Dover, O. R1 .....6.30†
Dravosburg, Pa. U5 ...6.30†
Fairfield, Ala. T2 .....6.30†
Gary, Ind. U5 .....6.30†
Granite City, Ill. G4 ....6.50*
Ind. Harbor, Ind. I-2 ...6.30†
Kokomo, Ind. C16 .....6.40‡
Martins Ferry, O. W10 ..6.30*
Middletown, O. A10 ...6.30†
Pittsburg, Calif. C11 ...7.05*
Pittsburgh J5 .....6.30†
Sparrows Pt., Md. B2 ..6.30†
Warren, O. R2 .....6.30†
Weirton, W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana, Calif. K1 ....6.975

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg, Pa. U5 ...9.275
Sparrows Point (39) B2..9.275

SHEETS, Galvannealed Steel

Canton, O. R2 .....6.70
Dravosburg, Pa. U5 ....6.70
Kokomo, Ind. C16 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland, Ky. A10 .....6.55
Middletown, O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland (28) R2 ....7.125
Niles, O. (28) R2 .....7.125
Weirton, W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler, Pa. A10 (type 1) 8.95
Butler, Pa. A10 (type 2) 9.05

SHEETS, Enameling Iron

Ashland, Ky. A10 .....6.325
Cleveland R2 .....6.325
Dravosburg, Pa. U5 ....6.325
Gary, Ind. U5 .....6.325
Granite City, Ill. G4 ...6.525
Ind. Harbor, Ind. I-2, Y1 6.325
Middletown, O. A10 ...6.325
Niles, O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee, W.Va. F4 ..8.35
Ind. Harbor, Ind. I-2 ...8.175
Yorkville, O. W10 .....8.175

SHEETS, Long Terne Steel (Commercial Quality)

Beech Bottom, W.Va. W10 6.70
Gary, Ind. U5 .....6.70
Mansfield, O. E6 .....6.70
Middletown, O. A10 ....6.70
Niles, O. M21 .....6.70
Weirton, W.Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown, O. A10 ....7.10

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman & Scott
M21 Mallory-Sharon Titanium Corp.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest. Steel Roll. Mill
N15 Northwestern S. & W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	4.675
Alton,Ill. L1	4.875
Ashland,Ky.(8) A10	4.675
Atlanta A11	4.875
Bessemer,Ala. T2	4.675
Birmingham C15	4.975
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	4.775
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	5.475
Gary Ind. U5	4.675
Houston S5	4.925
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa.(25) B2	4.675
KansasCity,Mo. S5	4.925
Lackaw'na,N.Y.(25) B2	4.675
LosAngeles(25) B3	5.425
Minnequa,Colo. C10	5.775
Pittsburg,Calif. C11	5.425
Riverdale,Ill. A1	4.675
SanFrancisco S7	5.95
Seattle(25) B3	5.675
Seattle N14	5.675
Sharon,Pa. S3	4.675
S.Chicago,Ill. W14	4.675
S.SanFrancisco(25) B3	5.425
SparrowsPoint,Md. B2	4.675
Sterling,Ill.(1) N15	4.675
Sterling,Ill. N15	4.775
Torrance Calif. C11	5.425
Warren,O. R2	4.675
Weirton,W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.75
Dravosburg,Pa. U5	7.75
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	7.75
LosAngeles B3	8.95
Newport,Ky. N9	7.75
Sharon,Pa. S3	7.75
S.Chicago,Ill. W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	7.05
Fairfield,Ala. T2	6.95
Gary,Ind. U5	6.95
Houston S5	7.20
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. S5	7.20
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	7.70
Seattle(25) B3	7.95
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	7.70
SparrowsPoint,Md. B2	6.95
Warren O. R2	6.95
Weirton,W.Va. W6	6.95
Youngstown U5, Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.925
Warren,O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	6.85
Boston T6	7.40
Buffalo B40	6.85
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn,Mich. D3	6.95
Detroit D2 M1, P20	6.95
Dover,O. G6	6.85
Ecorse,Mich. G5	6.95
Follansbee W.Va. F4	6.85
Fontana,Calif. K1	8.60
FranklinPark,Ill. T6	6.95
Ind.Harbor,Ind. Y1	6.85
Indianapolis C8	7.00
LosAngeles C1	8.50
NewBedford Mass. R10	7.30
NewBritain(10) S15	6.85
NewCastle,Pa. B4, E5	6.85
NewHaven,Conn. D2	7.30
NewKensington,Pa. A6	6.85
Pawtucket,R.I. R3	7.50
Pawtucket,R.I. N8	7.40
Pittsburgh J5	6.85
Riverdale,Ill. A1	6.95
Rome,N.Y.(32) R6	6.85
Sharon,Pa. S3	6.85
Trenton,N.J.(31) R5	8.30
Wallingford Conn. W2	7.30
Warren,O. R2, T5	6.85
Weirton,W.Va. W6	6.85
Worcester,Mass. A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	14.90
Carnegie,Pa. S18	14.55
Cleveland A7	14.55
Dover,O. G6	14.55
FranklinPark,Ill. T6	14.55
Harrison,N.J. C18	14.55
Indianapolis C8	14.70
Pawtucket,R.I. N8	14.90
Sharon,Pa. S3	14.55
Worcester,Mass. A7	14.85
Youngstown C8	14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn,Mich. D3	10.10
Dover,O. G6	10.10
Ecorse,Mich. G5	10.10
Ind.Harbor,Ind. Y1	10.20
Sharon,Pa. S3	10.00
Warren,O. R2	10.00
Weirton,W.Va. W6	10.20
Youngstown Y1	10.20

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	8.50	10.10	12.90	15.30	18.25
Boston T6	8.50	10.10	12.90	15.30	18.25
Bristol,Conn. W1	...	...	12.90	15.30	18.25
Carnegie,Pa. S18	...	9.80	12.60	15.00	....
Cleveland A7	7.95	9.80	12.60	15.00	17.95
Cleveland C7	...	9.80	12.60	15.00	17.95
Dover,O. G6	7.95	9.80	12.60	15.00	17.95
Detroit D2	8.05	9.90	12.70	15.10	....
Dearborn,Mich. D3	8.05	9.90	12.70	....	....
FranklinPark,Ill. T6	8.05	9.80	12.60	15.00	17.95
Harrison,N.J. C18	...	...	12.90	15.30	18.25
Indianapolis C8	8.10	9.95	12.60	15.00	17.95
NewBritain,Conn.(10) S15	7.95	9.80	12.60	15.00	17.95
NewCastle,Pa. B4, E5	7.95	9.80	12.60	15.00	....
NewHaven,Conn. D2	8.40	10.10	12.90	15.30	....
NewKensington,Pa. A6	7.95	9.80	12.60	15.00	....
NewYork W3	...	10.10	12.90	15.30	18.25
Pawtucket R.I. N8	8.50	10.10	12.90	15.30	18.25
Riverdale,Ill. A1	8.05	9.80	12.60	15.00	17.95
Rome,N.Y.(32) R6	7.95	9.80	12.60	15.00	17.95
Sharon,Pa. S3	7.95	9.80	12.60	15.00	17.95
Trenton,N.J. R5	...	10.10	12.90	15.30	18.25
Wallingford,Conn. W2	8.40	10.10	12.90	15.30	18.15
Warren,O. T5	7.95	9.80	12.60	15.00	17.95
Weirton,W.Va. W6	7.95	9.80	12.60	15.00	17.95
Worcester,Mass. A7, T6	8.50	10.10	12.90	15.30	18.25
Youngstown C8	7.95	9.80	12.60	15.00	17.95

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	16.80	20.65	....
Buffalo W12	16.80	....	....
FranklinPark,Ill. T6	17.15	21.00	25.35
Harrison,N.J. C18	16.80	20.65	25.00
NewYork W3	16.80	20.65	25.00
Palmer,Mass. W12	16.80	....	....
Trenton,N.J. R5	16.80	20.65	25.00
Worcester,Mass. W12	14.80	....	....
Worcester,Mass. A7, T6	16.80	20.65	25.00
Youngstown C8	17.15	21.00	25.35

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.975

TIGHT COOPERAGE HOOP

Atlanta A11	5.40
Riverdale,Ill. A1	5.25
Sharon,Pa. S3	5.10
Youngstown U5	5.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	7.60

STRIP, Electrogalvanized

Cleveland A7	6.85*
Dover,O. G6	6.85*
Riverdale,Ill. A1	6.95*
Warren,O. B9, T5	6.85*
Worcester,Mass. A7	7.40*
Youngstown C8	6.85*

*Plus galvanizing extras.

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom W.Va. W10	...	...	11.00	12.05	13.05
Brackenridge,Pa. A4	...	...	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. N9	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	....
Vandergrift,Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	....
Zanesville,O. A10	...	10.35	11.00	12.05	13.05
Zanesville,O. A10 (FP coils)	...	10.85	11.525	12.575	13.55
Zanesville,O. A10 (SP coils)	...	....	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS, (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*†	12.275*	....
IndianaHarbor Ind. I-2	9.20†	10.35*	11.025*†	12.075*	....
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*†	12.075*	13.05*
Vandergrift,Pa. U5	....	10.85†	11.525†	12.575†	13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	....	....	....
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge Pa. A4	....	16.90	18.50	19.00	19.50	14.05**
Butler,Pa. A10	....	....	....	18.50	19.00	19.50
Vandergrift,Pa. U5	..	15.90	16.90	18.50	19.00	19.50
Warren,O. R2	....	....	....	....	....	14.55†

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.30	$8.55	$8.90
Dravosburg,Pa. U5	8.30	8.55	8.95
Fairfield,Ala. T2	8.40	8.65	9.05
Fairless,Pa. U5	8.40	8.65	9.05
Fontana,Calif. K1	9.05	9.30	9.70
Gary,Ind. U5	8.30	8.55	8.95
GraniteCity,Ill. G4	8.40	8.65	9.05
IndianaHarbor,Ind. I-2, Y1	8.30	8.55	8.95
Niles,O. R2	8.30	8.55	8.95
Pittsburg,Calif. C11	9.05	9.30	9.70
SparrowsPoint,Md. B2	8.40	8.65	9.05
Weirton W.Va. W6	8.30	8.55	8.95
Yorkville,O W10	8.30	8.55	8.95

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.975	....	....
Niles,O. R2	7.425	7.625	7.825

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.60	$9.85
Dravosburg,Pa. U5	9.60	9.85
Fairfield,Ala. T2	9.70	9.95
Fairless,Pa. U5	9.70	9.95
Fontana,Calif. K1	10.35	10.60
Gary,Ind. U5	9.60	9.85
Ind.Harbor Y1	9.60	9.85
Pitts.,Calif. C11	10.35	10.60
Sp.Pt.,Md. B2	9.70	9.95
Weirton,W.Va. W6	9.60	9.85
Yorkville,O. W10	9.60	9.85

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.40
Dravosburg,Pa. U5	7.40
Fairfield,Ala. T2	7.50
Fairless,Pa. U5	7.50
Fontana,Calif. K1	8.15
Gary Ind. U5	7.40
GraniteCity,Ill. G4	7.50
Ind.Harbor,Ind. I-2, Y1	7.40
Niles,O. R2	7.40
Pittsburg,Calif. C11	8.15
SparrowsPoint,Md. B2	7.50
Weirton,W.Va. W6	7.40
Yorkville,O. W10	7.40

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	$7.15
Gary,Ind. U5	7.15
GraniteCity,Ill. G4	7.25
Ind.Harbor,Ind. Y1	7.15
Yorkville,O. W10	7.15

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$9.10
Gary,Ind. U5	9.10

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary Ind. U5	$10.65

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.20
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.40
Atlanta A11	7.40
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville,Ind. M8	7.30
Donora,Pa. A7	7.20
Duluth A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O.(24) S1	7.30
Houston S5	7.45
Jacksonville,Fla. M8	7.55
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. S5	7.45
Kokomo,Ind. C16	7.30
LosAngeles B3	8.15
Minnequa,Colo. C10	7.45
Monessen,Pa. P7 P16	7.20
N.Tonawanda,N.Y. B11	7.20
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	8.15
SparrowsPoint,Md. B2	7.30
Sterling,Ill.(1) N15	7.20
Sterling,Ill. N15	7.30
Struthers,O. Y1	7.20
Waukegan,Ill. A7	7.20
Worcester,Mass. A7	7.50

WIRE, Gal'd ACSR for Cores

Bartonville Ill. K4	11.75
Buffalo W12	11.75
Johnstown,Pa. B2	11.75
Minnequa,Colo. C10	11.875
Monessen,Pa. P16	11.75
Muncie,Ind. I-7	11.95
Palmer,Mass. W12	12.05
Pittsburg,Calif. C11	12.55
Portsmouth,O. P12	11.75
Roebling,N.J. R5	12.05
SparrowsPt.,Md. B2	11.85
Struthers,O. Y1	11.75

ROPE WIRE	(A)
Bartonville,Ill. K4	11.55
Buffalo W12	11.55
Fostoria,O. S1	11.55
Johnstown,Pa. B2	11.55
Monessen,Pa. P7, P16	11.55
Muncie,Ind. I-7	11.75
Palmer,Mass. W12	11.85
Portsmouth,O. P12	11.35
Roebling,N.J. R5	11.85
SparrowsPt.,Md. B2	11.65
Struthers,O. Y1	11.55
Worcester,Mass. J4	11.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Upholstery Spring

Aliquippa,Pa. J5	8.40
Alton,Ill. L1	8.60
Buffalo W12	8.40
Cleveland A7	8.40
Donora,Pa. A7	8.40
Duluth A7	8.40
Johnstown,Pa. B2	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.35
Minnequa,Colo. C10	8.60
Monessen,Pa. P7, P16	8.40
NewHaven,Conn. A7	8.70
Palmer,Mass. W12	8.70
Pittsburg,Calif. C11	9.35
Portsmouth,O. P12	8.40
Roebling,N.J. R5	8.70
S.Chicago,Ill. R2	8.40
S.SanFrancisco C10	9.35
SparrowsPoint,Md. B2	8.50
Struthers,O. Y1	8.40
Trenton,N.J. A7	8.70
Waukegan,Ill. A7	8.40
Worcester,Mass. A7	8.70

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	8.725
Alton,Ill. L1	8.925
Bartonville Ill. K4	8.825
Buffalo W12	8.725
Cleveland A7	8.725
Donora,Pa. A7	8.725
Duluth A7	8.725
Fostoria,O. S1	8.775
Johnstown,Pa. B2	8.725
LosAngeles B3	9.675
Milbury,Mass.(12) N6	9.025
Minnequa,Colo. C10	8.975
Monessen,Pa. P7, P16	8.725
Muncie,Ind. I-7	8.925
Palmer,Mass. W12	9.025
Pittsburg,Calif. C11	9.675
Portsmouth,O. P12	8.725
Roebling,N.J. R5	9.025
S.Chicago,Ill. R2	8.725
S.SanFrancisco C10	9.675
SparrowsPt.,Md. B2	8.825
Struthers,O. Y1	8.725
Trenton,N.J. A7	9.025
Waukegan,Ill. A7	8.725
Worcester A7, J4, T6	9.025

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	14.35
Bartonville,Ill. K4	14.25
Buffalo W12	14.15
Chicago W13	13.55
Cleveland A7	14.15
Crawfordsville,Ind. M8	14.25
Fostoria,O. S1	14.15
Jacksonville,Fla. M8	14.50
Johnstown,Pa. B2	14.15
Kokomo,Ind. C16	14.15
Minnequa,Colo. C10	13.90
Monessen,Pa. P6	14.15
Muncie,Ind. I-7	14.35
Palmer,Mass. W12	14.45
Roebling,N.J. C10	14.45
S.SanFrancisco C10	14.50
Waukegan,Ill. A7	14.15
Worcester,Mass. A7, T6	14.45

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	15.25
Monessen,Pa. P16	14.45
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	10.75
Baltimore T6	11.05
Boston T6	11.05
Buffalo W12	10.75
Cleveland A7	10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	10.75
Fostoria,O. S1	10.75
FranklinPark,Ill. T6	10.85
Kokomo,Ind. C16	10.75
Massillon,O. R8	10.75
Milwaukee C23	10.95
Monessen,Pa. P7, P16	10.75
NewKensington,Pa. A6	10.75
Palmer,Mass. W12	11.05
Pawtucket,R.I. N8	11.05
Riverdale,Ill. A1	10.85
Rome,N.Y. R6	10.75
Trenton,N.J. R5	11.05
Worcester,Mass. A7, T6	11.05

NAILS, Stock

To Dealers & Mfrs.	Col.
AlabamaCity, Ala. R2	184
Aliquippa,Pa. (7) J5	187
Atlanta A11	*166*
Bartonville,Ill. (7) K4	169
Chicago (7) W13	167
Cleveland (7) A9	173
Crawfordsville,Ind.(7)M8	169
Donora,Pa. A7	164
Duluth A7	164
Fairfield,Ala. T2	164
Houston,Tex.(7) S5	172
Jack'ville,Fla.(7)(20)M8	178
Johnstown,Pa. B2	*164*
Joliet,Ill. A7	164
KansasCity,Mo. (7) S5	172
Kokomo,Ind. (7) C16	169
Minnequa,Colo. (7) C10	172
Monessen,Pa. (7) P7	167
Pittsburg,Calif. C11	183
Rankin,Pa. A7	164
S.Chicago,Ill. R2	164
SparrowsPt.,Md. B2	*166*
Sterling,Ill.(1) N15	164
Worcester,Mass. A7	170

(To Wholesalers; per cwt)

Galveston,Tex. D7 ... $8.75

NAILS, Cut (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

STAPLES, Polished Stock

To Dealers & Mfrs.	Col.
AlabamaCity, Ala. R2	164
Aliquippa,Pa. (7) J5	167
Atlanta A11	*166*
Bartonville,Ill. (7) K4	169
Crawfordsville,Ind.(7)M8	169
Donora,Pa. A7	164
Duluth A7	164
Fairfield,Ala. T2	164
Jack'ville,Fla.(7)(20)M8	178
Johnstown,Pa. B2	*164*
Joliet,Ill. A7	164
Kokomo,Ind. (7) C16	169
Minnequa,Colo. (7) C10	172
Monessen,Pa. (7) P7	167
Pittsburg,Calif. C11	183
Rankin,Pa. A7	164
S.Chicago,Ill. R2	164
SparrowsPt.,Md. B2	*166*
Sterling,Ill.(1) N15	164
Worcester,Mass. A7	170

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	$9.53
Atlanta A11	*9.63*
Bartonville Ill. K4	10.13
Buffalo W12	10.05
Crawfordsville,Ind. M8	10.13
Donora,Pa. A7	9.53
Duluth A7	9.53
Jacksonville,Fla. M8	10.58
Johnstown,Pa. B2	*9.53*
Joliet,Ill. A7	9.53
Kokomo,Ind. C16	10.13
LosAngeles B3	*10.32*
Minnequa,Colo. C10	10.28
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.53
S.SanFrancisco C10	10.81
SparrowsPt.,Md. B2	*9.63*
Sterling,Ill.(1) N15	9.53

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	$9.85
Atlanta A11	*9.95*
Bartonville,Ill. K4	10.45
Buffalo W12	10.35
Crawfordsville,Ind. M8	10.45
Donora,Pa. A7	9.85
Duluth A7	9.85
Jacksonville,Fla. M8	10.91
Johnstown,Pa. B2	*9.85*
Joliet,Ill. A7	9.85
Kokomo,Ind. C16	10.45
LosAngeles B3	*10.65*
Minnequa,Colo. C10	10.60
Pittsburg,Calif. C11	10.65
S.Chicago,Ill. R2	9.85
S.SanFrancisco C10	11.15
SparrowsPt.,Md. B2	*9.95*
Sterling,Ill.(1) N15	9.85

Coil Interim	
AlabamaCity,Ala. R2	$9.90
Atlanta A11	*10.00*
Bartonville,Ill. K4	10.50
Buffalo W12	10.40
Crawfordsville,Ind. M8	10.50
Donora,Pa. A7	9.90
Duluth A7	9.90
Jacksonville,Fla. M8	10.96
Johnstown,Pa. B2	*9.90*
Joliet,Ill. A7	9.90
Kokomo,Ind. C16	10.50
LosAngeles B3	*10.70*
Minnequa,Colo. C10	10.65
Pittsburg,Calif. C11	10.70
S.Chicago,Ill. R2	9.90
S.SanFrancisco C10	11.20
SparrowsPt.,Md. B2	*10.00*
Sterling,Ill.(1) N15	9.90

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	184**
Aliquippa,Pa. J5	184§
Atlanta A11	*190**
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	193
Donora,Pa. A7	184†
Duluth A7	184†
Fairfield,Ala. T2	184†
Houston,Tex. S5	192**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	*188**
Joliet,Ill. A7	184†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Monessen,Pa. P7	191*
Pittsburg,Calif. C11	204†
Rankin,Pa. A7	184†
S.Chicago,Ill. R2	184**
S.SanFrancisco C10	207**
SparrowsPoint,Md. B2	*190**
Sterling,Ill.(1) N15	188*

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	181**
Aliq'ppa,Pa. 9-14½ga.J5	184§
Atlanta A11	*182**
Bartonville,Ill. K4	187
Crawfordsville,Ind. M8	187
Donora,Pa. A7	176†
Duluth A7	176†
Fairfield,Ala. T2	176†
Houston,Tex. S5	186**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	*180**
Joliet,Ill. A7	176†
KansasCity,Mo. S5	186**
Kokomo,Ind. C16	183†
Minnequa,Colo. C10	186**
Monessen,Pa. 9 ga. P7	185*
Pittsburg,Calif. C11	199†
Rankin,Pa. A7	176†
S.Chicago,Ill. R2	176**
Sterling,Ill.(1) N15	180*

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	15.70	17.25**
Bartonville K4	16.10	18.05
Buffalo W12	16.10	....
Cleveland A7	15.70	17.25†
Crawf'dsville M8	16.20	18.15
Fostoria,O. S1	16.20	17.75†
Jacksonville M8	16.45	18.40
Johnstown B2	16.10	18.05*
Kokomo C16	16.20	17.75†
Minnequa C10	16.45	18.15**
P'im'r,Mass.W12	16.10	17.65*
Pitts.,Calif. C11	16.05	17.60†
SparrowsPt. B2	16.20	18.15*
Sterling(1) N15	16.10	18.05*
Waukegan A7	15.70	17.25†
Worcester A7	16.00	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	7.95	8.35**
Aliquippa J5	8.10	8.625§
Atlanta A11	*8.05*	*8.65**
Bartonville(48) K4	8.20	8.80
Buffalo W12	8.10	8.50†
Cleveland A7	7.95	....
Crawfordsville M8	8.20	8.80
Donora,Pa. A7	7.95	8.35†
Duluth A7	7.95	8.35†
Fairfield T2	7.95	8.35†
Houston(48) S5	8.35	8.75**
Jack'ville,Fla. M8	8.45	9.05
Johnstown B2(48)	8.10	8.70*
Joliet,Ill. A7	7.95	8.35†
Kans.City(48) S5	8.35	8.75**
Kokomo C16	8.20	8.80†
LosAngeles B3	*8.90*	*9.50**
Minnequa C10	8.35	8.75**
Monessen P7 (48)	8.10	8.70*
Palmer,Mass. W12	8.40	8.80†
Pitts.,Calif. C11	8.90	9.30†
Portsmouth,O. P12	8.10	....
Rankin,Pa. A7	7.95	8.35†
S.Chicago R2	7.95	8.35**
S.SanFran. C10	9.05	9.45**
spar'wsPt. B2(48)	8.20	8.80*
Sterling(1)(48)N15	7.95	8.55*
Struth'rs,O.(48) Y1	*7.95*	*8.45‡*
Worcester,Mass. A7	8.25	8.65†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	190
Atlanta A11	*192*
Bartonville Ill. K4	197
Crawfordsville,Ind. M8	197
Donora,Pa. A7	190
Duluth A7	190
Fairfield,Ala. T2	190
Jacksonville,Fla. M8	202
Joliet,Ill. A7	190
Houston S5	200
KansasCity,Mo. S5	200
Kokomo,Ind. C16	197
Minnequa,Colo. C10	200
Pitts.,Calif. C11	214
S.Chicago Ill R2	190
SparrowsPoint,Md. B2	*192*
Sterling,Ill. N15	190
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	167
Duluth A7	167
Franklin,Pa. F5	167
Huntington,W.Va. W7	169
Johnstown,Pa. B2	167
Marion,O. P11	167
Minnequa,Colo. C10	172
Moline,Ill. R2	172
S.Chicago,Ill. R2	167
Sterling,Ill. N15	167
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts

Full Size Body (cut thread)

½ in. and smaller:

6 in. and shorter	55
Longer than 6 in.	46.5

⅝ in. thru 1 in.:

6 in. and shorter	46.5
Longer than 6 in.	44

1⅛ in. and larger:

All lengths	44

Undersized Body (rolled thread)

½ in. and smaller:

6 in. and shorter	55

Carriage, Machine, Lag Bolts Hot Galvanized:

½ in. and smaller:

6 in. and shorter	35
Longer than 6 in.	23

⅝ in. thru 1 in.:

6 in. and shorter	20
Longer than 6 in.	20

1⅛ in. and larger:

All lengths	20

Lag Bolts

All diameters:

6 in. and shorter	55
Longer than 6 in.	47

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter 54

Larger than ½ in. or longer than 6 in. 47

Blank Bolts 47

Step, Elevator, Tire Bolts 54

NUTS

Reg. & Heavy Square Nuts:

All sizes 59

Square Nuts, Reg. & Heavy, Hot Galvanized:

All sizes 45

Hex Nuts, Reg. & Heavy, Hot Pressed:

⅝ in. and smaller ..63

⅞ in. to 1 in. incl. 59.5

1⅛ in. to 1½ in., incl. 64

1⅝ in. and larger .. 58

Hex Nuts, Reg. & Heavy, Cold Punched:

⅝ in. and smaller.. 63

⅞ in. to 1½ in., incl. 59.5

1⅝ in. and larger.. 58

Hex Nuts, All Types, Hot Galvanized:

⅝ in. and smaller.. 50

⅞ in. to 1 in., incl. 46

1⅛ in. to 1½ in., incl. 51

Hex Nuts, Semifinished, Reg. & Heavy (Incl. Slotted):

⅝ in. and smaller.. 63

⅞ in. to 1½ in., incl. 59.5

1⅝ in. and larger.. 58

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller ... 65

1⅛ in. to 1½ in., incl. 62

1⅝ in. and larger.. 58

CAP AND SET SCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread Bright:

6 in. and shorter:

⅝ in. and smaller.. 47

¾, ⅞ and 1 in. diam. 31

Longer than 6 in.:

⅝ in. and smaller.. 18.5

¾, ⅞ and 1 in. diam. 5.5

High Carbon, Heat Treated:

6 in. and shorter:

⅝ in. and smaller.. 34

¾, ⅞ and 1 in. diam. 13

Longer than 6 in.:

⅝ in. and smaller.. +1

¾, ⅞ and 1 in. diam. ..... +19

Fillister Head, Coarse Thread:

Listed Sizes ..... +31

Flat Head, Coarse Head:

¼ in. and smaller by 6 in. and shorter .. +57

Set Screws, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam.:

6 in. and shorter .. 11

Longer than 6 in. .. +10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 10.85

$\frac{1}{16}$-in. under List less 26.5%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	23.56	22.84
1¼	13	....	27.92	22.68
1½	13	26.34	30.86	25.08
1¾	13	31.12	36.45	29.64
2	13	34.88	40.85	33.21
2¼	13	39.29	46.01	37.42
2½	12	42.64	49.94	40.61
2¾	12	46.98	55.01	44.73
2¾	12	50.86	59.57	48.44
3	12	54.24	63.53	51.66

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Toe Rails All No. 2	Toe Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.075	4.975	5.025	6.00
Ensley,Ala. T2	5.075	4.975	....	6.00
Fairfield,Ala. T2	....	....	....	6.00
Gary,Ind. U5	5.075	4.975	5.025	....
Huntington,W.Va. W7	....	....	....	6.15
IndianaHarbor,Ind. I-2	5.075	4.975	5.025	....
Johnstown,Pa. B2	....	....	...(16)	6.00
Lackawanna,N.Y. B2	5.075	4.975	...(16)	6.00
Minnequa,Colo C10	5.075	4.975	....	6.50
Steelton,Pa. B2	5.075	4.975	....	....
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	6.025
Gary,Ind. U5	6.025
Ind.Harbor,Ind. I-2	6.025
Lackawanna,N.Y. B2	6.025
Minnequa,Colo. C10	6.025
Seattle B3	6.175
Steelton,Pa. B2	6.025
Torrance,Calif. C11	6.175

JOINT BARS

Bessemer,Pa. U5	6.35
Fairfield,Ala. T2	6.35
Ind.Harbor,Ind. I-2	6.35
Joliet,Ill. U5	6.35
Lackawanna,N.Y. B2	6.35
Minnequa,Colo. C10	6.35
Steelton,Pa. B2	6.35

AXLES

Ind.Harbor,Ind. S13	8.10
Johnstown,Pa. B2	8.10

TRACK BOLTS, Untreated

Cleveland R2	13.10
Lebanon,Pa. B2	13.10
Minnequa,Colo. C10	13.10
Pittsburgh P14	13.10
Seattle B3	13.60

SCREW SPIKES

Cleveland R2	12.85
Pittsburgh P14	12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	8.775
Ind.Harbor,Ind. I-2, Y1	8.775
KansasCity,Mo. S5	8.775
Lebanon,Pa. B2	8.775
Minnequa,Colo. C10	8.775
Pittsburgh J5	8.775
Seattle B3	9.275
S.Chicago,Ill. R2	8.775
Struthers,O. Y1	8.775
Youngstown R2	8.775

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.25c; 1 15/16 to 8 in., inclusive, 6.60c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¼" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.30c, for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 8.65c, over 3½-in. and other shapes.

Watch this 17,000-jewel movement

(Sliding guard removed, wheel guard raised, and coolant flow reduced.)

PHOTOGRAPHED AT COLE CARBIDE INDUSTRIES, ROYAL OAK, MICH.

CARBORUNDUM's Diamond Wheels are by far your best choice for grinding cemented carbide tools. On this rotary table surface grinder, a B7 Resinoid Bond Diamond Wheel permits maximum production rates without risk of checking or cracking the carbide . . . cuts exceptionally free and cool . . . requires less pressure between wheel and work to achieve accurate size control. CARBORUNDUM also produces a top-quality line of metal bond Diamond Wheels for offhand work and cutting off. Ask your CARBORUNDUM Distributor or salesman for your free copy of Form A-1208, an authoritative 40-page booklet on "Grinding Cemented Carbides". Or write The Carborundum Company, Niagara Falls, New York. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ontario.

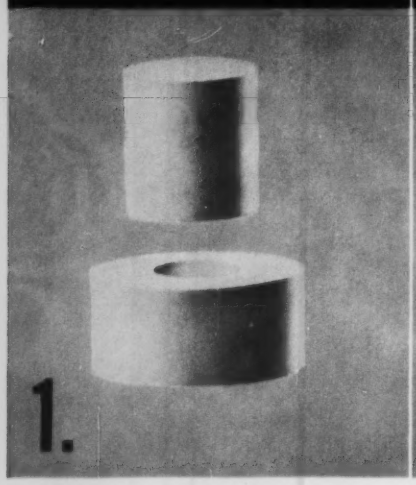
Through application "know-how" and product quality

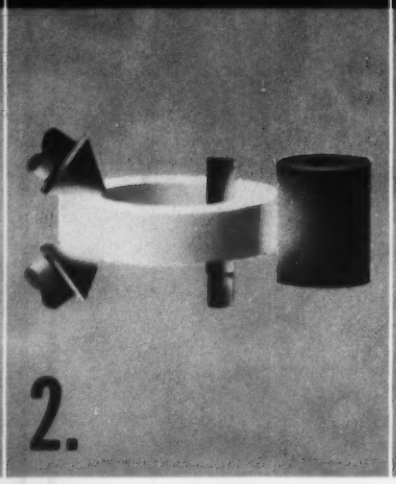
CARBORUNDUM

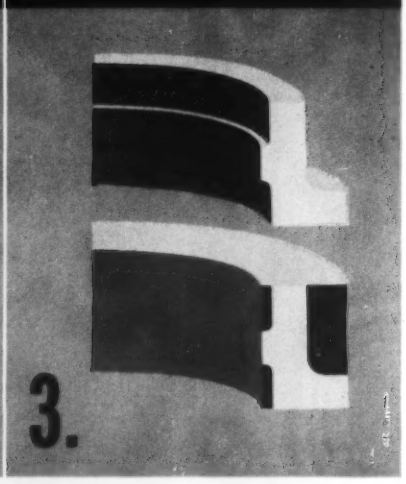
REGISTERED TRADE MARK

continually puts more sense in your abrasive dollar

Why users get
better service
from Edgewater
ROLLED STEEL RINGS







1. A solid block of steel sliced from an ingot or rolled bar and heated to forging temperature is upset and punched, forming the "blank."

2. The Ring Rolling Mill enlarges the diameter of the blank, reduces its thickness and forms the ribs, flanges, etc., as required, in one continuous operation.

3. Upper view shows accurately shaped section of typical ring, as rolled. Lower view shows material wasted if machined from plain rectangular ring.

FORGING and ROLLING give Edgewater Rings

Maximum strength and toughness with minimum weight

Edgewater Steel Company

P. O. Box 478, Pittsburgh 30, Penna.

WRITE for a 12-page bulletin detailing the Edgewater process for making weldless steel rings.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Ambridge, Pa. N2	+2	....	4.5	....	7	....	8.5	....	8.5	....	8.25	....	10.75	....
Lorain, O. N3	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Youngstown Y1	0.5	+17.5	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Alton, Ill. L1	....	....	....	....	....	....	10.5	+3.75	13.5	+4.75	16	+1.25	18.5	0.5
Benwood, W. Va. W10	10	+20.5	+0.25	+27.75	+9.75	+37.25	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Butler, Pa. F6	10	+20.5	0.5	+27	+8.5	+36	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Fairless, Pa. N3	....	....	....	....	....	....	10.5	+8.75	13.5	+4.75	16	+1.25	18.5	0.5
Fontana, Calif. K1	....	....	....	....	....	....	9	+19.25	3	+15.25	5.5	+11.75	8	+10
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	11.5	+7.75	14.5	+3.75	17	+0.25	19.5	1.5
Lorain, O. N3	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sharon, Pa. S4	11	+19.5	1.5	+26	+7.5	+35	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sparrows Pt., Md. B2	9	+21.5	0.5	+28	+9.5	+37	10.5	+8.75	13.5	+4.75	16	+1.25	18.5	0.5
Wheatland, Pa. W9	11	+19.5	1.5	+26	+7.5	+35	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Youngstown R2, Y1	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5

Size—Inches	1⅛		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Alton, Ill. L1	19	1.5	19.5	2	21	2.75	21	2.75	....	....	....	....
Benwood, W. Va. W10	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+0.75	13.5	+5.25
Etna, Pa. N2	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25
Fairless, Pa. N3	19	1.5	19.5	2	21	2.75	21	2.75	11.5	+7.25	11.5	+7.25
Fontana, Calif. K1	8.5	+9	9	+8.5	10.5	+7.75	10.5	+7.75	1	+17.75	1	+17.75
Indiana Harbor, Ind. Y1	20	2.5	20.5	3	22	3.75	22	3.75	12.5	+6.25	12.5	+6.25
Lorain, O. N3	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sharon, Pa. M6	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sparrows Pt., Md. B2	19	1.5	19.5	2	21	2.75	21	2.75	11	+7.25	11	+7.25
Wheatland, Pa. W9	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25
Youngstown R2, Y1	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging —Billets—	Seamless Tube —Billets—	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	19.75	24.50	....	....	33.00	....	....	....	45.00	41.50
202	21.00	27.25	33.00	....	35.75	37.25	39.25	41.25	45.25	45.25
301	20.50	25.25	33.75	....	34.00	38.25	40.50	42.50	47.25	43.75
302	22.00	28.00	34.00	....	36.75	38.75	40.75	43.00	47.50	47.50
302B	21.75	28.25	35.25	....	40.25	38.75	40.75	43.00	50.00	50.00
303	....	28.50	37.00	....	....	41.50	43.75	45.50	52.00	52.00
304	23.25	29.25	36.00	....	39.75	40.75	43.00	45.75	50.25	50.25
304L	....	....	43.00	....	46.75	48.25	50.25	53.25	57.75	57.75
305	24.75	32.50	37.75	....	43.00	40.75	43.00	46.25	53.50	53.50
308	26.75	34.00	42.50	....	45.50	48.25	50.50	55.00	57.50	57.50
309	34.75	44.00	51.50	....	58.50	57.50	60.50	64.25	73.50	73.50
310	42.50	53.75	69.00	....	75.50	77.50	81.50	83.25	87.00	87.00
314	....	....	....	....	....	77.50	....	83.25	....	....
316	35.25	44.50	56.25	....	63.50	63.50	66.75	70.25	74.75	74.75
316L	....	....	62.75	....	70.00	71.00	74.25	77.75	82.25	82.25
317	43.00	54.50	70.00	....	81.50	79.50	83.50	86.25	93.25	93.25
321	28.25	35.75	42.25	....	48.75	48.00	50.25	54.50	60.00	60.00
18-8CbTa	32.75	42.00	50.25	....	58.25	56.25	59.00	63.75	73.00	73.00
403	....	....	30.75	....	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	....	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	....	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	....	40.25	37.75	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	....	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	....	32.00	33.50	35.25	49.75	49.75
431	....	27.25	35.50	....	....	39.75	41.75	43.50	53.00	53.00
446	....	....	37.75	....	56.75	42.50	44.75	46.00	67.25	80.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates —Carbon Base— 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	33.25
304	....	34.50	....	41.50	35.25
304-L	....	37.20	....	44.65	....
316	....	38.70	....	46.65	52.25
316-L	....	45.70	....	54.35	....
316-CB	....	45.90	....	54.75	....
321	....	36.35	....	43.40	42.00
347	....	39.50	....	48.45	51.90
405	....	29.20	....	37.05	....
410	....	28.70	....	36.55	....
430	....	28.70	....	36.55	....
Inconel	45.70	54.80	63.85	73.00	....
Nickel	37.95	46.25	54.60	62.95	....
Nickel, Low Carbon	38.25	46.90	55.60	64.40	....
Monel	40.30	49.10	57.95	66.80	....
Copper*	....	....	....	....	48.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.60	41.40

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.043-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	HI-Carbon-Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.170
18.25	4.25	1	4.75	....	2.385
18	4	2	9	....	2.7675
18	4	2	....	....	1.845
18	4	1	....	....	1.680
9	3.5	....	....	....	1.275
13.5	4	3	....	....	1.945
13.75	3.75	2	5	....	2.325
6.4	4.5	1.9	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross tons, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
AlabamaCity,Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	58.50	59.00‡	63.00	....
Cincinnati, deld	....	66.79	....	....
Buffalo District				
Buffalo H1, R2	62.50	63.00	63.50	64.00
Tonawanda,N.Y. W12	62.50	63.00	63.50	64.00
N.Tonawanda,N.Y. T9	....	63.00	63.50	64.00
Boston, deld.	73.79	74.29	74.79	....
Rochester,N.Y., deld.	65.52	66.02	66.52	....
Syracuse,N.Y., deld.	66.62	67.12	67.62	....
Chicago District				
Chicago I-3	62.50	63.00	63.00	63.50
Gary,Ind. U5	62.50	....	63.00	....
S.Chicago,Ill. R2	62.50	....	63.00	....
S.Chicago,Ill. Y1	62.50	63.00	63.00	....
S.Chicago,Ill. U5	62.50	....	63.00	63.50
S.Chicago,Ill. W14	62.50	....	63.00	63.50
Milwaukee, deld.	64.80	65.30	65.30	65.80
Muskegon,Mich., deld.	....	69.68	69.68	....
Cleveland District				
Cleveland R2, A7	62.50	63.00	63.00	63.50
Akron,O., deld.	65.25	65.75	65.75	66.25
Mid-Atlantic District				
Bethlehem,Pa. B2	64.50	65.00	65.50	66.00
New York, deld.	....	69.01	69.51	....
Newark,N.J., deld.	67.70	68.20	68.70	69.20
Birdsboro,Pa. B10	64.50	65.00	65.50	66.00
Chester,Pa. P4	64.50	65.00	65.50	....
Philadelphia, deld.	66.26	66.76	67.26	....
Steelton,Pa. B2	64.50	65.00	65.50	66.00
Swedeland,Pa. A3	64.50	65.00	65.50	66.00
Philadelphia, deld.	66.26	66.76	67.26	67.76
Troy,N.Y. R2	64.50	65.00	65.50	66.00
Pittsburgh District				
NevilleIsland,Pa. P6	62.50	63.00	63.00	63.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	64.45	64.45	64.95
McKeesRocks,Pa. deld.	....	64.10	64.10	64.63
Lawrenceville, Homestead, Wilmerding, Monaca,Pa., deld.	....	64.76	64.76	65.29
Verona, Trafford,Pa., deld.	64.79	65.32	65.32	65.85
Brackenridge,Pa., deld	65.10	65.60	65.60	66.13
Bessemer,Pa. U5	62.50	....	63.00	63.50
Clairton,Rankin,S.Duquesne,Pa. U5	62.50	....	....	....
Midland,Pa. C18	62.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1	....	....	63.00	....
Sharpsville,Pa. S6	62.50	....	63.00	63.50
Youngstown Y1	....	....	63.00	63.50
Mansfield,O., deld.	67.40	....	67.90	68.40
Duluth I-3	62.50	63.00	63.00	63.50
Erie,Pa. I-3	62.50	63.00	63.00	63.50
Everett,Mass. E1	63.25	63.75	64.25	....
Fontana,Calif. K1	70.00	70.50	....	....
Geneva,Utah C11	62.50	63.00	....	....
GraniteCity,Ill. G4	64.40	64.90	65.40	....
Ironton,Utah C11	62.50	63.00	....	....
LoneStar,Tex. L6	58.50*	59.00†	....	....
Minnequa,Colo. C10	64.50	65.00	65.50	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	62.50	63.00	63.00	63.50
Cincinnati, deld.	68.26	68.76	....	....

*Phos. 0.51-0.75%; Phos. 0.31-0.50%, $59.50.
†Phos. 0.51-0.75%; Phos. 0.31-0.50%, $60.
‡Phos. 0.70-0.90%; intermediate (Phos. 0.31-0.69%), $60.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	71.50
Buffalo H1	72.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon: add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$97.50
NiagaraFalls, N.Y. P15	97.50
Keokuk,Iowa, Open-hearth & Fdry, freight allowed K2	102.00
Keokuk, O.H. & Fdry, 12½ lb pigiets, 16% Si, frgt allowed K2	105.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$76.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	76.50
Steelton,Pa. B2 (Phos. 0.035% max)	70.50
Philadelphia, deld.	74.05
Troy,N.Y. R2 (Phos. 0.035% max)	70.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	67.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, Spokane, 10 cents; Atlanta, Houston, Seattle, no charge.

	SHEETS			STRIP	BARS				Standard	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Mer-chant Qual.	H.R. Spec. Qual.	C.F. Rds.‡	H.R. Alloy 4140††	Structural Shapes	Carbon	Floor
Atlanta	8.07§	9.27§	9.83§	....	8.16	8.30	...	10.14	....	8.44	8.40	10.22
Baltimore	7.79	8.99	9.12	....	8.27	8.34	8.87	9.09‡	15.69	8.57	8.12	9.56
Birmingham	7.68§	8.88§	8.85§	....	7.78	7.91	8.44	10.04	....	8.05	8.01	10.04
Boston	8.70	9.73	11.02	....	8.79	8.88	9.43	10.71	14.46	8.90	8.98	10.39
Buffalo	7.75	8.90	10.72	....	8.00	8.00	8.70	8.70	14.30	8.25	8.25	9.80
Chattanooga	7.90§	9.10§	9.10§	....	8.00	8.13	8.66	9.96	....	8.27	8.23	9.98
Chicago	7.70	8.90	9.70	....	7.78	7.91	8.44	8.35	13.95	8.05	8.01	9.26
Cincinnati	7.82	8.89	9.75	....	8.06	8.19	8.72	8.82	14.23	8.55	8.34	9.53
Cleveland	7.68	8.88	9.60	....	7.88	7.99	8.52	8.60	14.03	8.38	8.21	9.46
Denver	9.55	11.09	12.41	....	9.70	9.75	...	10.54	18.89	9.60	9.50	11.15
Detroit	7.91	9.13	10.02	....	8.10	8.18	8.71	8.68	14.19	8.55	8.33	9.49
Erie, Pa.	7.75	8.88	9.60††	....	7.90	8.00	8.65	8.70††	....	8.35	8.20	9.50
Houston	8.70	9.65	10.99	....	8.80	8.95	9.50	10.70	15.00	9.40	9.10	10.60
Jackson, Miss.	8.00§	9.20§	9.22§	....	8.10	8.23	8.76	10.14	....	8.37	8.33	10.08
Los Angeles	8.90	10.65	11.65	....	9.10	8.80	9.50	11.70	15.25	8.95	9.35	11.50
Milwaukee	7.82	9.02	9.82	....	7.90	8.03	8.56	8.57	14.07	8.24	8.13	9.38
Moline, Ill.	7.48	8.59	9.45	....	7.56	7.62	...	8.10	....	7.78	7.80	...
New York	8.35	9.53	10.23	57.73	8.81	8.83	9.38	10.61	14.37	8.74	8.78	10.05
Norfolk, Va.	7.85	...	...	....	8.30	8.35	...	10.80	....	8.60	8.10	9.60
Philadelphia	7.89	9.08	10.12	....	8.58	8.37	8.90	9.12	14.15	8.38	8.28	9.37
Pittsburgh	7.68	8.88	10.06	50.00	7.88	7.91	8.44	8.60	13.95	8.05	8.01	9.26
Portland, Oreg.	8.29	9.49	10.31	....	8.39	8.52	...	9.21	14.60	8.75	8.71	11.60
Richmond, Va.	8.05	...	10.09	....	8.45	8.70	9.20	10.00	....	8.80	8.35	9.70
St. Louis	8.02	9.21	10.03	....	8.11	8.25	8.78	8.93	14.28	8.48	8.34	9.59
St. Paul	7.83	8.78	9.80	....	7.91	7.97	...	8.70	....	8.13	8.15	9.42
San Francisco	8.75	10.30	10.80	....	8.95	8.80	9.35	12.30	15.25	8.85	8.85	11.15
Seattle	9.35	11.20	11.55	....	9.50	9.30	9.85	13.15	15.55	9.15	9.05	11.25
Spokane, Wash.	9.35	11.35	11.55	....	9.50	9.30	9.85	13.15	16.30	9.15	9.05	11.25
Washington	8.37	10.57	...	....	9.06	8.92	...	9.67	....	9.15	8.70	10.14

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; **¼-in. and heavier; ††as annealed; §42 in. and under.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; ‡—400 to 999 lb; §—1000 to 1999 lb; ¶—2000 to 3999 lb; ¹⁰—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $128; Salina, Pa., $133; Niles, O., $138; Cutler, Utah, $148.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $165; Stevens Pottery, Ga., $175.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $140; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $145; E. Chicago, Ind., Joliet, Rockdale, Ill., $150; Lehigh, Utah, $165; Los Angles, $170.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $220; Danville, Ill., $223; Philadelphia, Clearfield, Pa., $230.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $275; Danville, Ill., $278; Philadelphia, Clearfield, Pa., $285.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $315; Danville, Ill., $318; Philadelphia, Clearfield, Pa., $325.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $177; Clearfield, Pa., $189.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $292; Clearfield, Pa., $311.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $221; Clearfield, Pa., $236.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ⅛-in. grains with fines: Chewelah, Wash., $43; Luning, Nev., $43; ⅝-in. grains with fines: Baltimore $69.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$11.28
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	12.10
High phos.	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	32.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$29.00-30.00
Domestic, scheelite, mine	55.00

Manganese Ore

Mn 48%, contracts, nominally $1.35-1.40, per long ton unit, c.i.f. U.S. ports, duty for buyer's account; 46-47%, $1.15. Spot cargoes, 10 to 15% higher.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$52.00-53.50
48% 2.8:1	nom. 49.00-50.00
48% no ratio	39.00-40.00

South African Transvaal

48% no ratio	$37.50-39.00
44% no ratio	26.00-27.00

Turkish

48% 3:1	$60.00-63.00

Domestic

Rail nearest seller

48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.35-3.80
60-65%	3.80-3.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge iron:	
Swedish, c.i.f. Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b. Riverton, N.J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	24.00
Annealed, 99.5% Fe	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 86.00-275.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb. drum frght. allowed	
Carlots	36.20
Ton lots	38.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	38.50-48.25†
Bronze, 5000-lb lots	59.50-63.00†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	58.00-61.00†
Phosphor-Copper, 5000-lb lots	65.00
Silicon	47.50
Solder	7.00*
Stainless Steel, 302	99.00
Stainless Steel, 316	$1.32
Tin	14.50*
Zinc 5000-lb lots	19.75-33.00‡
Tungsten:	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.50
Less than 1000 lb	4.65
Chromium, electrolytic 99.8% Cr min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam	Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5½	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.85
17	60	11.85
17	72	11.40
20	84	11.25
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.25-14.75
Connellsville, foundry	17.00-18.00

Oven Foundry Coke

Birmingham, ovens	$27.60
Cincinnati, deld.	32.53
Buffalo, ovens	29.50
Camden, N.J., ovens	28.50
Detroit, ovens	29.50
Pontiac, deld.	31.15
Saginaw, deld.	32.73
Erie, Pa., ovens	29.50
Everett, Mass., ovens New England, deld.	30.55*
Indianapolis, ovens	28.75
Ironton, O., ovens	28.00
Cincinnati, deld.	28.25
Kearny, N.J., ovens	28.75
Lone Star, Tex., ovens	25.50
Milwaukee, ovens	29.50
Painesville, O., ovens	29.50
Cleveland, deld.	31.55
Philadelphia, ovens	28.50
St. Louis, ovens	28.50
Neville Island (Pittsburgh), Pa., ovens	28.25
St. Paul, ovens	28.50
Chicago, deld.	31.82
Swedeland, Pa. ovens	28.50
Terre Haute, Ind., ovens	28.75

*Or within $4.55 freight zone from works.

Imported Steel

(Base per 100 lb. landed, duty paid. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.30	$7.30	$7.30	$7.70
Bar Size Angles	7.11	7.11	7.11	7.51
Structural Angles	7.50	7.50	7.50	7.90
I-Beams	7.75	7.75	7.75	8.15
Plates	9.35	9.35	9.35	9.75
Sheets, H.R.	8.75	8.75	8.75	9.15
Sheets, C.R. (drawing quality)	9.10	9.10	9.10	9.45
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	27.42	27.42	27.42	31.38
Barbed Wire (†)	6.61	6.61	6.61	6.95
Mechant Bars	7.30	7.30	7.30	7.70
Hot-Rolled Bands	7.50	7.50	7.50	7.90
Wire Rods, Thomas Commercial No. 5	6.38	6.38	6.38	6.78
Wire Rods, O-H Cold Heading Quality No. 5	6.72	6.72	6.72	7.12
Bright Common Wire Nails	8.15	8.15	8.15	8.45

Oil Country Pipe: Mills withdrawn for remainder of the year.

†Per 82-lb. net, reel. §Per 100-lb kegs, 20d nails and heavier

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $102; 19-21% Mn, 1-3% Si $99.50; 16-19% Mn, $97.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $235, Johnstown, Duquesne, Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $223 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 33.75c per lb of contained Mn, carload packed 35.05c, ton lots 36.55c, less ton 37.75c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 24.15c per lb of contained Mn, packed, carload 25.45c, ton lot 27.05c, less ton 28.25c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 33c; 2000 lb to min carload, 35c; 500 lb to 1999 lb, 37c; 50 lb cans, 37.5c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.95c per lb of alloy. Packed, c.l. 14.15, ton 14.60c, less ton 15.6c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract ton lot 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 5% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 27.75c per lb of contained Cr; c.l. packed 29.3c, ton lot 31.05c; less ton 32.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 34.75c per lb contained Cr, 0.02% max 41.5c, 0.03% max 41c, 0.06% max 39.5c, 0.1% max 39c, 0.15% max 38.75c, 0.2% max 38.5c, 0.5% max 38.25c, 1.0% max 37.5c, 1.5% max 37.35c, 2.0% max 37.25c. Ton lot, add 3.4c, less ton add 5.1c. Carload packed add 1.75c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in. x D, bulk 29.05c per lb contained Cr. Packed, c.l. 30.65c, ton 32.45c, less ton 33.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 20.85c, per lb of alloy, ton lot 22.10c; less ton lot 23.3c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 41.35c per lb of contained Cr; 1" x down, bulk 42.35c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lots $1.31; less ton lots $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed, 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si. Packed, c.l. 16c, ton lot 17.45c, less ton 19.1c. F.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per pound contained silicon. Packed, c.l. 17.25c, ton lot, 19.05c; less ton, 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 98% Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3⅛ lb each and containing 2 lb of Cr). Contract, carload, bulk, 19c per lb of briquet, carload packed in box pallets 19.2c, in bags 20.1c; 3000 lb to c.l. in box pallets 20.4c; 2000 lb to c.l. in bags, 21.3c; less than 2000 lb in bags 22.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 13.9c per lb of briquet, c.l. packed, pallets 14.1c, bags 15.1c; 3000 lb to c.l., pallets 15.3c; 2000 lb to c.l. bags, 16.3c, less ton 17.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 14.4c per lb of briquet, c.l. packed, pallets, 14.6c; bags 15.6c, 3000 lb to c.l., pallets, 15.8c; 2000 lb to c.l., bags 16.8c; less ton 17.7c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.55c per lb of briquet, packed, pallets, 7.75c; bags 8.75c; 3000 lb to c.l., pallets 9.35c; 2000 lb to c.l. bags 10.35c; less ton 11.25c. Delivered. Spot, add 0.25c. (Small size—Weighing approx. 2½ lb and containing 1 lb of Si). Carload, bulk 7.7c. Packed, pallets 7.9c; bags 8.9c; 3000 lb to c.l. pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $4.95 per lb of contained Cb plus Ta, delivered; less ton lots $5.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ½-in. x 12 M, 19c per lb of alloy, ton lots 20.15c, less ton 21.4c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lots 20.15c; less ton lots 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lots 19.55c; less ton lots 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth and Washington, Pa., $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

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Scrap Market Displays Strength

Slight price advance is noted at some consuming points despite absence of large-scale mill purchases. Export demand appears to be less pressing

Scrap Prices, Page 183

Pittsburgh — The market is steady, without much activity at the dealer or broker level. Mills are making some purchases.

The extreme shortage of stainless scrap and buying from neighboring areas have resulted in some mills paying as much as $500 for a ton of 18-8 bundles and solids.

Philadelphia—The scrap market is stronger in this district. Prime grades of open-hearth material are up $1 to $57-$58, delivered, on the basis of sales. While No. 2 heavy melting is unchanged at $48, No. 2 bundles are higher at $46-$47.

Heavy turnings are higher at $52-$53, delivered, and low phos structurals and plate at $62-$63. Couplers, springs and wheels are up slightly to $70, delivered.

New York—While brokers' buying prices on the major grades of iron and steel scrap are unchanged, those on nickel bearing stainless steel scrap are soaring. Quotations on 18-8 sheets, clips and solids are holding at $475-$485. Some brokers offer even more. Prices on 18-8 borings and turnings have been jumped to $290-$300. Certain inland districts are drawing heavily on the eastern seaboard for nickel bearing scrap, especially the solids. Straight chrome grades of stainless are in light demand, with prices unchanged.

Cincinnati — Except for a few item adjustments, scrap prices are pretty well stabilized here. The market firmed up a couple weeks ago on the purchase of a representative tonnage by a local consumer, No. 1 heavy melting going at $56-$57.

Youngstown—Local steelmakers are worried about their winter supplies of metallics. The scrap market continues strong, with prices here several dollars a ton above those quoted at other major steel centers.

Cleveland — The market shows underlying strength both in the Valley and here, but with representative mill buying lacking, prices are holding unchanged on the basis of $61-$62 for No. 1 heavy melting at Cleveland, and $63-$64 in the Valley.

Stainless scrap, especially 18-8 solids, is in exceptionally strong demand. With supplies scarce, prices are skyrocketing. Most of the 18-8 grades collected in this and adjacent areas appear to be moving to Pittsburgh mills. Based on prices delivered at Pittsburgh, local brokers are offering $450-$500 for 18-8 bundles and solids, and $300-$310 for turnings.

Chicago—Definite firming in the market is noted here. While consumer acquisitions of melting steel at higher prices have not been recorded, broker buying of certain dealer grades to apply on old orders suggests price rises may be in the offing. For example, it is doubtful if a mill can buy No. 1 dealer heavy melting at $56. This grade appears to be at least $1 to $2 stronger.

Boston — Steel and cast iron scrap prices are unchanged. Buying for export is somewhat slower due to congestion of tonnage awaiting loading. Shipments to district and eastern Pennsylvania mills, while not as heavy as they were last quarter, are still substantial.

Detroit—Prices are firm in this area, but most brokers and dealers anticipate a decline as increased auto production results in the generation of a larger tonnage of automotive scrap. New auto lists are expected to bring lower prices at the end of this month.

Buffalo—Anticipated mill orders failed to develop last week. Local prices are nominally unchanged, but some observers think the next mill purchases will bring a drop of about $2 on the secondary grades.

Dealers have cleaned up shipments on old contracts. They report little new business. Top grade material is scarce, but the secondary grades are plentiful. Production scrap is coming out in better volume, but miscellaneous scrap from auto wreckers, farmers and other sources is noticeably slower.

Birmingham — Cast iron scrap prices remain soft because of a drop in orders for new cast iron pipe. The export market continues strong, and prices are high. An Atlanta open-hearth scrap consumer bought No. 2 steel last week at $47, delivered. This leaves the Birmingham price unchanged.

St. Louis—Rail scrap prices are easing off slightly, with drops ranging from 50 cents to $2. Demand for rails is strong, but the mills are seeking to depress high prices and are turning down offerings.

Los Angeles—The scrap market continues strong, with prices moving sharply upward. No. 1 and No. 2 heavy melting advanced $7, to $57 and $54. No. 1 bundles moved forward from $48 to $55, No. 2 bundles from $40 to $47. Machine shop turnings jumped from $29 to $32. Although most cast scrap buyers are paying about $55 for No. 1 cupola cast, the posted price is $60.

San Francisco — Steel scrap is moving freely in this market with no indications of an immediate change in prices.

Seattle—Scrap slipped $2 a ton here last week, No. 1 and No. 2 heavy melting steel dropping to $51, and $47. No. 1 bundles declined to $47. Dealers anticipate a further decline when the effects of recent eastern reductions reach the Pacific Coast.

Japanese buyers continue to purchase in volume, and ship charters from this coast, the gulf and North Atlantic ports, reflect an extremely firm market. Two cargoes, Hawaii to Japan, were reported at $160,000 freight each, lump sum, free load and discharge. Several deals were closed Pacific Coast to Japan at $187,500 and $195,000. Two vessels were taken, Alaska loading to Japan at $205,000 and $221,000. One cargo was booked at $18 a long ton.

Iron and Steel Scrap

Consumer prices, per gross tons, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Oct. 24	$57.00
Oct. 17	56.67
Sept. Avg.	59.08
Oct. 1955	45.17
Oct. 1951	43.60

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	55.00-56.00
No. 2 heavy melting	49.00-50.00
No. 1 bundles	55.00-56.00
No. 2 bundles	46.00-47.00
No. 1 busheling	55.00-56.00
Machine shop turnings	*39.00-40.00*
Mixed borings, turnings	*39.00-40.00*
Short shovel turnings	*43.00-44.00*
Cast iron borings	*43.00-44.00*
Cut structurals, 3 ft lengths	*67.00-68.00*
Heavy turnings	52.00-53.00
Punchings & plate scrap	*67.00-68.00*
Electric furnace bundles	*67.00-68.00*

Cast Iron Grades

No. 1 cupola	51.00-52.00
Heavy breakable cast	49.00-50.00
Unstripped motor blocks	36.00-37.00
No. 1 machinery cast	58.00-59.00

Railroad Scrap

No. 1 R.R. heavy melt	*66.00-67.00*
Rails, 2 ft and under	*79.00-80.00*
Rails, 18 in. and under	*80.00-81.00*
Rails, random lengths	*78.00-79.00*
Railroad specialties	*73.00-74.00*

Stainless Steel Scrap

18-8 bundles & solids	*460.00-500.00*
18-8 turnings	*350.00-380.00*
430 bundles & solids	110.00-120.00
430 turnings	*80.00-85.00*

CLEVELAND

No. 1 heavy melting	61.00-62.00
No. 2 heavy melting	44.00-45.00
No. 1 bundles	61.00-62.00
No. 2 bundles	40.00-41.00
No. 1 busheling	61.00-62.00
Machine shop turnings	32.50-33.50
Mixed borings, turnings	36.50-37.50
Short shovel turnings	36.50-37.50
Cast iron borings	36.50-37.50
Cut foundry steel	58.00-59.00
Low phos.	62.50-63.50
Cut structural plates 2 ft and under	67.00-68.00
Alloy free, short shovel turnings	43.00-44.00
Electric furnace bundles	61.00-62.00

Cast Iron Grades

No. 1 cupola	57.00-58.00
Charging box cast	50.00-51.00
Heavy breakable cast	48.00-49.00
Stove plate	54.00-55.00
Unstripped motor blocks	36.00-37.00
Brake shoes	44.00-45.00
Clean auto cast	56.00-57.00
Burnt cast	43.00-44.00
Drop broken machinery	59.00-60.00

Railroad Scrap

No. 1 R.R. heavy melt.	65.00-66.00
R.R. malleable	70.00-71.00
Rails, 2 ft and under	83.00-84.00
Rails, 18 in. and under	84.00-85.00
Rails, random lengths	80.00-81.00
Cast steel	69.00-70.00
Railroad specialties	74.00-75.00
Uncut tires	73.00-74.00
Angles, splice bars	75.00-76.00
Rails, rerolling	82.00-83.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	*450.00-500.00*
18-8 turnings	*300.00-310.00*
430 clips, bundles, solids	*115.00-120.00*
430 turnings	*55.00-65.00*

YOUNGSTOWN

No. 1 heavy melting	63.00-64.00
No. 2 heavy melting	47.00-48.00
No. 1 bundles	63.00-64.00
No. 2 bundles	43.00-44.00
No. 1 busheling	63.00-64.00
Machine shop turnings	34.00-35.00
Short shovel turnings	38.00-39.00
Cast iron borings	38.00-39.00
Low phos.	65.00-66.00
Electric furnace bundles	63.00-64.00

Railroad Scrap

No. 1 R.R. heavy melt.	66.00-67.00

CHICAGO

No. 1 heavy melting	56.00-60.00
No. 2 heavy melting	46.00-47.00
No. 1 factory bundles	62.00-64.00
No. 1 dealer bundles	56.00-57.00
No. 2 bundles	41.00-42.00
No. 1 busheling	56.00-60.00
Machine shop turnings	35.00-36.00
Mixed borings, turnings	37.00-38.00
Short shovel turnings	37.00-38.00
Cast iron borings	37.00-38.00
Cut structurals, 3 ft	65.00-66.00
Punchings & plate scrap	66.00-67.00

Cast Iron Grades

No. 1 cupola	50.00-51.00
Stove plate	46.00-47.00
Unstripped motor blocks	39.00-40.00
Clean auto cast	55.00-56.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt	62.00-63.00
R.R. malleable	70.00-71.00
Rails, 2 ft and under	81.00-82.00
Rails, 18 in. and under	82.00-83.00
Angles, splice bars	73.00-74.00
Rails, rerolling	83.00-85.00

Stainless Steel Scrap

18-8 bundles & solids	505.00-515.00
18-8 turnings	355.00-375.00
430 bundles & solids	105.00-110.00
430 turnings	60.00-65.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	55.00
No. 2 heavy melting	41.00
No. 1 bundles	56.00
No. 2 bundles	37.00
No. 1 busheling	55.00
Machine shop turnings	*31.00*
Mixed borings, turnings	33.00
Short shovel turnings	34.00
Punchings & plate scrap	*58.00-60.00*

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	41.00
Stove plate	42.00
Heavy breakable	41.00
Unstripped motor blocks	32.00
Clean auto cast	53.00
Malleable	52.00

BIRMINGHAM

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	42.00-43.00
No. 2 bundles	34.00-35.00
No. 1 busheling	42.00-43.00
Cast iron borings	25.00-26.00
Short shovel turnings	35.00-36.00
Machine shop turnings	33.00-34.00
Bar crops and plate	59.00-60.00
Structural & plate, 2 ft	57.00-58.00
Electric furnace bundles	*52.00-53.00*
Cut foundry steel	*50.00-51.00*

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	53.00-54.00
Stove plate	51.00-52.00
Unstripped motor blocks	*46.00-47.00*
Charging box cast	40.00-41.00
No. 1 wheels	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	56.00-57.00
Rails, 18-in. and under	74.00-75.00
Rails, rerolling	77.00-78.00
Rails, random lengths	69.00-70.00
Angles, splice bars	*68.00-69.00*

PHILADELPHIA

No. 1 heavy melting	*57.00-58.00*
No. 2 heavy melting	48.00
No. 1 bundles	*57.00-58.00*
No. 2 bundles	*46.00-47.00*
No. 1 busheling	*57.00-58.00*
Electric furnace bundles	60.00
Mixed borings, turnings	41.00
Machine shop turnings	40.00
Short shovel turnings	44.00-45.00
Heavy turnings	*52.00-53.00*
Structurals & plates	*62.00-63.00*
Couplers, springs, wheels	*70.00*
Rail crops, 2 ft & under	*77.00-80.00*

Cast Iron Grades

No. 1 cupola	53.00-54.00
Malleable	68.00†
Heavy breakable cast	56.00-57.00
Drop broken machinery	58.00-59.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	52.00-53.00
No. 2 heavy melting	42.00-43.00
No. 1 bundles	52.00-53.00
No. 2 bundles	40.00-41.00
Machine shop turnings	31.00-32.00
Mixed borings, turnings	31.00-32.00
Short shovel turnings	37.00-38.00
Low phos. (structural & plate)	54.00-55.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Unstripped motor blocks	36.00-37.00
Heavy breakable	48.00-48.50

Stainless Steel

18-8 sheets, clips, solids	*475.00-485.00*
18-8 borings, turnings	*290.00-300.00*
430 sheets, clips, solids	115.00-120.00
410 sheets, clips, solids	105.00-110.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	48.00-49.00
No. 2 Heavy melting	37.00-37.50
No. 1 bundles	48.00-49.00
No. 2 bundles	35.00-35.50
No. 1 busheling	48.00-49.00
Machine shop turnings	29.00-30.00
Mixed borings, turnings	31.00-32.00
Short shovel turnings	32.00-33.00
No. 1 cast	44.50-45.50
Mixed cupola cast	40.00-41.00
No. 1 machinery cast	45.50-46.00

BUFFALO

No. 1 heavy melting	57.00-58.00
No. 2 heavy melting	45.00-46.00
No. 1 bundles	57.00-58.00
No. 2 bundles	42.00-43.00
No. 1 busheling	57.00-58.00
Mixed borings, turnings	34.00-35.00
Machine shop turnings	31.00-32.00
Short shovel turnings	35.00-36.00
Cast iron borings	34.00-35.00
Low phos.	60.00-61.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	49.00-50.00
No. 1 machinery	54.00-55.00

Railroad Scrap

Rails, random lengths	71.00-72.00
Rails, 3 ft and under	77.00-78.00
Railroad specialties	68.00-69.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	56.00-57.00
No. 2 heavy melting	45.00-46.00
No. 1 bundles	56.00-57.00
No. 2 bundles	41.00-42.00
No. 1 busheling	56.00-57.00
Machine shop turnings	35.00-36.00
Mixed borings, turnings	*36.00-37.00*
Short shovel turnings	39.00-40.00
Cast Iron borings	*36.00-37.00*
Low phos., 18 in.	*63.00-64.00*

Cast Iron Grades

No. 1 cupola	48.00-49.00
Heavy breakable cast	47.00-48.00
Charging box cast	48.00-49.00
Drop broken machinery	58.00-59.00

Railroad Scrap

No. 1 R.R. heavy melt.	62.00-63.00
Rails, 18 in. and under	76.00-77.00
Rails, random lengths	68.00-69.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	51.50
No. 2 heavy melting	45.00
No. 1 bundles	51.50
No. 2 bundles	41.00
No. 1 busheling	51.50
Machine shop turnings	32.00
Short shovel turnings	36.00

Cast Iron Grades

No. 1 cupola	50.00
Charging box cast	43.00
Heavy breakable cast	43.00
Unstripped motor blocks	43.00
Brake shoes	51.00
Clean auto cast	*53.00*
Stove plate	43.50

Railroad Scrap

No. 1 R.R. heavy melt.	*62.50*
Rails, 18 in. and under	*80.00*
Rails, rerolling	*86.00*
Rails, random lengths	77.50
Angles, splice bars	61.00

SEATTLE

No. 1 heavy melting	*51.00*
No. 2 heavy melting	*47.00*
No. 1 bundles	*47.00*
No. 2 bundles	35.00
Machine shop turnings	28.00-30.00
Mixed borings, turnings	28.00-30.00
Electric furnace No. 1	60.00-65.00

Cast Iron Grades

No. 1 cupola	50.00-52.00
Heavy breakable cast	48.00-50.00
No. 1 wheels	37.00
Unstripped motor blocks	48.00-50.00
Stove plate (f.o.b. plant)	40.00-42.00

LOS ANGELES

No. 1 heavy melting	*57.00*
No. 2 heavy melting	*54.00*
No. 1 bundles	*55.00*
No. 2 bundles	*47.00*
Machine shop turnings	*12.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*60.00*

SAN FRANCISCO

No. 1 Heavy melting	50.00
No. 2 heavy melting	52.00
No. 1 bundles	53.00
No. 2 bundles	43.00
Machine shop turnings	35.00
Mixed borings, turnings	35.00
Cast iron borings	35.00
Heavy turnings	35.00
Short shovel turnings	38.00
Cut structurals	62.00

Cast Iron Grades

No. 1 cupola	60.00
Charging box cast	45.00-47.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	50.00
Clean auto cast	60.00
No. 1 wheels	48.00
Drop broken machinery	60.00

HAMILTON, ONT.

No. 1 heavy melting	52.00
No. 2 heavy melting	47.00
No. 1 bundles	52.00
No. 2 bundles	*40.50*
Mixed steel scrap	46.00
Busheling, new factory:	
Prepared	50.00
Unprepared	46.00
Short steel turnings	*35.00*

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b., Hamilton, Ont.

A SYMBOL OF LEADERSHIP IN IRON & STEEL SCRAP SINCE 1889

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EXPORTS-IMPORTS LIVINGSTON & SOUTHARD, INC. 99 Park Ave., New York, N. Y. *Cable Address:* **FORENTRACO**

Metals Face Slow Buildup

The fourth quarter splurge of orders still eludes metals men. But compared with any year except 1955, this is a good one, and it may get better by December

Nonferrous Metal Prices, Pages 186 & 187

FOURTH QUARTER demand for nonferrous metals is building steadily but at a slower pace than anticipated.

Two possible reasons: 1. The introduction of three-year labor contracts assures major industries that they can plan production without strike interruptions. 2. Supplementary Unemployment Benefit programs are making manufacturers more cognizant of the desirability of high, steady production.

Aluminum—Supply and demand are in reasonable balance. Predicts Nathanael V. Davis, president, Aluminium Ltd.: "The U.S. and Canada will produce about 2.3 million tons of primary aluminum in 1956 . . . Indications are that this production will be required by consuming industries this year, that none of it has been or will be taken for U.S. government stockpile."

U.S. primary aluminum production recovered quickly from its strikebound pace in August when only 92,406 tons were produced. September tonnage was 132,316.

Copper—As anticipated, the primary price began to break last week as Phelps-Dodge Corp., second largest domestic producer, went from 40 cents a pound to 36 cents, effective Oct. 25. This followed another reduction in custom smelters' price from 37 cents to 35 cents a pound. Anaconda Co. and Kennecott Copper Corp. were expected to follow suit before the week end. Look for auto makers to jump into the market now that the price is more to their liking.

Metal sales to the brass mills are still slow, with most users taking minimum contractual tonnages. Wire and cable producers continue to add stability to the market.

Labor negotiations with Chilean miners are getting under way. Miners will continue to work until Dec. 31, 1956, under present terms, but they will gain the benefits of a new contract immediately if it is negotiated prior to then.

Lead, Zinc—Diecasters have entered the market but are still purchasing minimum tonnages. Some deferral of shipments is being encountered by producers. Points out one zinc man: "You must remember that there is no reason to carry an excessive inventory. No one believes the price of zinc is going up." Galvanizers are hoping to keep the market firm at the 13.50 cent a pound level. Diecasters continue to look for automotive business and are predicting that November will be a better month than October. "The level of business we are experiencing would have been considered excellent a few years ago," reports a zinc diecaster. "Sometimes," he adds, "we take the peaks as normal business years and become disappointed if business levels off, even on a high plateau."

Lead sales are good across the board. The market is firm, and the price is steady at 16 cents a pound.

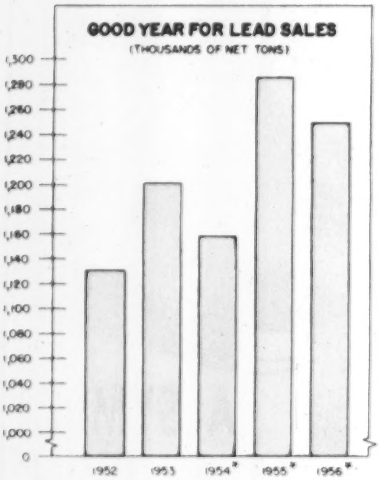
NONFERROUS PRICE RECORD

	Price Oct. 24	Last Change		Previous Price	Sept. Avg.	Aug. Avg.	Oct., 1955 Avg.
Copper	35.00–40.00	Oct.	22, 1956	37.00–40.00	39.500	39.750	44.594
Lead	15.80	Jan.	13, 1956	16.30	15.800	15.800	15.300
Zinc	13.50	Jan.	6, 1956	13.00	13.500	13.500	13.020
Tin	105.875	Oct.	23, 1956	106.75	103.745	99.043	96.230
Nickel	64.50	Nov.	24, 1954	60.00	64.500	64.500	64.500
Aluminum	27.10	Aug.	10, 1956	25.90	27.100	26.700	24.400
Magnesium	35.25	Aug.	13, 1956	33.75	35.250	34.694	32.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

Suez Inflates Tin Price

The spot price of domestic tin came close to 107 cents a pound last week. The high price could be attributed in part to the delay of several ships through the Suez Canal. With supply and demand in almost exact balance, the delay of these ships, each carrying about 500 tons of tin, could cause an artificial shortage because deliveries would be made in November rather than October.



Sources: 1952-1955, U.S. Bureau of the Census; 1956, STEEL estimate.

*Includes government stockpile purchases of 65,000 tons in 1954; 77,000 tons in 1955; 60,000 tons in 1956.

Nickel Skies Brighter?

Arthur S. Flemming, director of defense mobilization, announced on Oct. 17 that an additional 5 million lb of nickel will be diverted to industry during the fourth quarter. (Diversions for the fourth quarter now total 25 million lb.) It is hoped there will be more nickel available for consumer goods, but most of it probably will go for military work.

GOOD AND STRAIGHT—*won't whip!*

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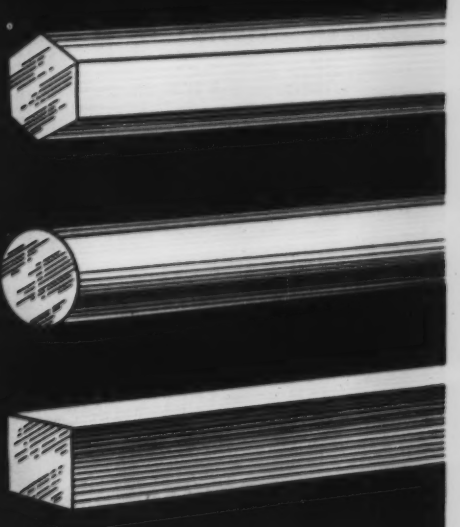
Screw machines really purr along when you feed them Chase Free-Cutting Brass rod! Uniform lengths and straight lengths that won't whip, superior machinability, longer runs before regrinding tools, all mean more pieces per length, fewer rejects and less down time per machine. Order from your Chase warehouse!



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Atlanta Baltimore Boston Charlotte Chicago Cincinnati Cleveland Dallas Denver Detroit Grand Rapids Houston Indianapolis Kansas City, Mo. Los Angeles Milwaukee Minneapolis Newark New Orleans New York Philadelphia Pittsburgh Providence Rochester St. Louis San Francisco Seattle Waterbury

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots, 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 214, 30.50; No. 356, 28.90. 30-lb ingots.

Antimony: R.M.M brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 36.00-40.00 deld. Conn. valley; 36.00-40.00 deld. Midwest; custom smelters, 35.00 deld.; lake, 40.00 deld.; fire refined, 36.75-39.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 98 + %, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex. 13 in. sticks, 59.00, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand castings), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $103-$108 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $13.50-$15 per lb.

Silver: Open market, 91.375 per troy oz.

Sodium: 16.50, e.l.; 17.00, l.e.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.50-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 105.875; prompt, 105.625.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.2% Fe max), $3.00; grade A-2 (0.5% Fe max), $2.70 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom, f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $5. Treated ingot, $6.70.

Zinc: Prime Western, 14.00; brass special, 14.25; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.55; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 15.00; No. 2, 19.00; No. 5, 18.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10 per lb; reactor grade, $14-$22 per lb, depending on quantity. Powder electronics grades, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 25.75-30.00; No. 12 foundry alloy (No. 2 grade), 24.00-24.50; 5% silicon alloy, 0.60 Cu max, 26.00-27.00; 13 alloy, 0.60 Cu max, 26.00-27.00; 195 alloy, 26.50-27.50; 108 alloy, 24.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.25; grade 2, 23.50, grade 3, 22.75; grade 4, 22.25.

Brass Ingot: Red brass, No. 115, 35.00; tin bronze, No. 225, 46.00; No. 245, 41.50; high-leaded tin bronze, No. 305, 38.50; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 30.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nominal 1.9% Be alloy) Strip, $1.86-$1.91, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.88, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots 45.35¢; l.c.l., 45.98. Weatherproof, 30,000-lb lots, 43.78; l.c.l., 44.53. Magnet wire deld., 15,000 lb or more, 52.68; l.c.l., 53.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheet and strip, $12.10-$13.00; sheared mill plate, $10.50-$12.00; wire, $9.50-$11.50; forging billets, $7.25-$7.50; hot-rolled and forged bars, $7.55-$7.80.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	113	97	118
Strip, C.R.	111	99	128
Plate, H.R.	107	96	111
Rod, Shapes, H.R.	94	80	99
Seamless Tubes	144	120	190

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.136	40.90-45.40	....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	39.60-42.90
0.037-0.030	44.30-50.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.60-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in 24-60 in. width or diam, 72-240 in. lengths

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.8
5050-F	41.3	45.9
3004-F	42.3	47.8
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.3

*24-48 in. widths or diam, 72-180 lengths

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.40
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.90-47.50	61.50-65.80
12-14	46.20-47.70	62.20-66.80
15-17	46.40-48.30	63.50-68.50
18-20	47.00-48.80	65.50-71.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; 0.81 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.0, 93.30 Tread plate, .188 in., 71.70; .250-2.0 in., 70.60 Tooling plate, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 14.50-15.00; old sheets, 11.50-12.00; borings and turnings, 8.00-8.50; crankcases, 11.50-12.00; industrial castings, 11.50-12.00.

Copper and Brass: No. 1 heavy copper and wire, 25.50-26.00; No. 2 heavy copper and wire, 24.00-24.50; light copper, 21.50-22.00; No. 1 composition turnings, 22.00-22.50; yellow brass turnings, 15.00-15.50; new brass clippings, 21.50-22.00; light brass, 13.00-13.50; heavy yellow brass, 15.00-15.50; new brass rod ends, 19.00-19.50; auto radiators, unsweated, 17.50-18.00; cocks and faucets, 18.00-18.50; brass pipe, 19.00-19.50.

Lead: Heavy, 12.50-13.00; battery plates, 7.00-7.25; linotype and stereotype, 13.50-14.00; electrotype, 12.50-13.00; mixed babbitt, 13.50-14.50.

Monel: Clippings, 80.00-90.00; old sheets, 70.00-80.00; turnings, 70.00-80.00; rods, 80.00-90.00.

Nickel: Sheets and clips, 130.00-195.00; rolled anodes, 130.00-195.00; turnings, 110.00-165.00; rod ends, 130.00-195.00.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	61.63b	58.56c	....	61.82	36.000	36.000	35.250
Yellow Brass	52.10	42.65d	52.64	55.01	27.250	27.000	25.125
Low Brass, 80%	55.85	55.79	56.39	58.66	30.625	30.375	29.875
Red Brass, 85%	57.19	57.13	57.73	60.09	31.875	31.625	31.125
Com. Bronze, 90%	59.08	59.02	59.62	61.84	33.125	32.875	32.375
Manganese Bronze	59.46	53.56	63.80	....	25.250	25.000	24.500
Muntz Bronze	53.84	49.65	....	....	25.625	25.375	24.875
Naval Brass	55.72	50.03	62.78	58.88	25.250	25.000	24.500
Silicon Bronze	65.22	64.41	65.26	67.26e	35.000	34.750	34.000
Nickel Silver, 10%	67.76	70.09g	70.09	....	32.750	32.500	16.375
Phos. Bronze, A, 5%	79.58	80.08	80.08	81.26	36.250	36.000	35.000

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

Zinc: Old zinc, 4.50-5.50; new die-cast scrap, 4.00-4.50; old die-cast scrap, 2.50-3.00.

REFINERS' BUYING PRICES
(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 18.50-19.00; 3003 clippings, 18.50-19.00; 6151 clippings, 18.50-19.00; 5052 clippings, 18.50; 2014 clippings, 17.50-18.50; 2017 clippings, 17.50-18.50; 2024 clippings, 17.50-18.50; mixed clippings, 17.50; old sheets, 16.00; old cast, 16.00; clean old cable (free of steel), 18.00-18.50; borings and turnings, 15.75-17.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 62.00; light scrap, 57.00; turnings and borings, 42.00.

Copper and Brass: No. 1 heavy copper and wire, 28.00; No. 2 heavy copper and wire, 26.50; light copper, 24.25; refinery brass (60% copper) per dry copper content, 26.01-26.25.

INGOTMAKERS' BUYING PRICES
(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 28.00; No. 2 heavy copper and wire, 26.50; light copper, 24.25; No. 1 composition borings, 26.00-26.50; No. 1 composition solids, 26.50-27.00; heavy yellow brass solids, 18.00; yellow brass turnings, 17.50; radiators, 20.50.

MAINTENANCE FOREMAN

Experienced in foundry maintenance. Modern mechanized plant. Good working conditions. Pensions. Health & Life Insurance. Paid holidays and vacations. Please state experience, age and expected salary.

Write to Box 481, STEEL
Penton Bldg. Cleveland 13, Ohio

CLASSIFIED

Help Wanted

MACHINE SHOP FOREMAN

Well established producer and fabricater of welded steel tubing has opening for aggressive experienced Machine Shop Foreman. Duties include design and production of all tools, rolls, bending dies, and gauges, and special equipment. Good salary and benefits. Write Box 475, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

Do you need a:
LIAISON ENGINEER
MATERIALS ENGINEER
VALUE ANALYST
MATERIALS BUYER
OR COMBINATION OF ABOVE?

Metallurgist, B.S. degree, age 30, 5½ years manufacturing and engineering experience with accessories, farm equipment and aircraft manufacturers, desires to become associated with Purchasing Dept. of progressive manufacturer. Education, experiences and interests lie with material selection and its processing, with emphasis on steel application, heat treatment and electroplating and other surface protection. If you are looking for someone with a broad range of interests and knowledge and who is interested in designing and manufacturing quality products at low cost, write Box 480, STEEL, Penton Bldg., Cleveland 13, Ohio.

PROJECT ENGINEERS

KAISER ENGINEERS

will bring you to mild, smog-free San Francisco Bay Area

Do you and your family want to enjoy sunshine, mild climate, indoor-outdoor living, and new schools? Beaches, mountains, and metropolitan recreation? Plus life insurance, free family health plan—retirement, moving allowance, etc.?

This can be yours if you have an M.E. degree, 10 years of steel mill development experience including plant layout, construction design, and are interested in planning the future of the West's largest steel mill.

Investigate. Write today in strict confidence, stating salary required.

KAISER ENGINEERS
DEPT R1 1924 BROADWAY,
OAKLAND 12, CALIFORNIA
DIVISION OF HENRY J. KAISER CO.

EDITOR

National metalworking magazine has opening for young man as an assistant editor. Industrial and/or writing experience helpful. Should be able to talk with top level management and production executives. Unlimited opportunity for advancement in pay, prestige and job satisfaction. Tell us about your education, experience and ambitions. Box 482, STEEL, Penton Bldg., Cleveland 13, Ohio.

INDUSTRIAL ENGINEERS

Career opportunities are available for qualified men with at least two (2) years experience in Time Study for Incentive Development, Methods Analysis and/or Standard Cost. Background of steel operations desirable. Interview and relocation allowances. Prompt consideration will be given all replies. Submit resume to:

PERSONNEL DIRECTOR
GREAT LAKES STEEL CORPORATION
Ecorse, Detroit 29, Mich.

TECHNICAL WRITER

Are you interested in a challenging opportunity as a technical writer and editor with leading national metalworking magazine? We have an opening for a young man, preferably with mechanical or metallurgical degree. Experience with steel mill or steel mill equipment builder helpful. Tell us about your education, experience, personal situation and ambitions. Box 483, STEEL, Penton Bldg., Cleveland 13, Ohio.

SPECIAL S & S SELECTION

From Stock of 2500 Machine Tools

16' x ¼" Niagara Shear—1942
16' x ¾" Birdsboro Brake—1940
5" Universal Boring Mill w/threading—1940
9" National Upsetter w/air clutch—1942
25' x ⅝" H & J #7 Roll
15' x 10' x 36' Betts Planer (extra heavy)
80" x ¾" Pels Shear
20" x 110" Vert. Mill & Die—(extra heavy)
Beatty #118 350 ton Hvy Dty Punch—1945
#368 Pels Beam Shear—angles up to 6" x 6" x ⅝"
7'-17" Fosdick Radial Drill—1940
96" G&E Spur, Helical & Worm Generator
72" G&E Gear Enveloper
8" Barrett Hor. Boring Mill—Now in oper.
PLANERS: 120" x 60" x 22' D&H opnsde
72" x 60" x 24' D&H opnsde hvy dty wrm drv 3 motor drive, rapid traverse box tbl —pendant control

12' #3 H&J Pyramid Roll, drp end 2 mtr
13' Southwark Initial Roll, open end

S&S MACHINERY CO.
140 53rd St.
Bklyn 32, N. Y.
HYacinth 2-7400—Cable: Sandstools

FROM STOCK
IMMEDIATE SHIPMENT
STRUCTURAL WIDE FLANGE BEAMS ASTM-A-7
400 TONS 10" x 5¾" x 21# x 40'
200 TONS 12" x 6½" x 27# x 40'
PRICE: $12.60 per cwt., net
All Extras Included
FOR QUICK ACTION
WRITE OR WIRE
Box 476, STEEL
Penton Bldg. Cleveland 13, Ohio

WANT TO BUY
1000 to 1500 Ton
Hobbing Press
Write Box 484, STEEL
Penton Bldg. Cleveland 13, Ohio

COMMISSION REPRESENTATIVES WANTED
WELL RATED NATIONALLY KNOWN MANUFACTURER OF ROLL FORMED SECTIONS, MOULDING, BUTT AND LOCKSEAM TUBING, ANGLES, CHANNELS ETC., IS EXPANDING AND DESIRES ADDITIONAL REPRESENTATION. TERRITORIES OPEN INCLUDE BIRMINGHAM, CHICAGO, MILWAUKEE, BOSTON, HOUSTON, NEW ORLEANS, LOS ANGELES AND ROCK ISLAND AREAS. IF YOU ARE A SUCCESSFUL, ESTABLISHED ORGANIZATION CALLING ON USERS OF STEEL AND NON-FERROUS METALS AND DESIRE AN ADDITIONAL LINE, WRITE US, GIVING FULL INFORMATION.
ROLL FORMED PRODUCTS COMPANY
P.O. BOX 418
YOUNGSTOWN, OHIO

Photo courtesy of Caterpillar Tractor Co., Peoria, Ill.

it's only part of the HTM* story...

STRENGTH

High ultimate strength of HTM castings helps the famous Cat D7 Tractor do the tough jobs day-in and day-out. Vital parts, such as the front idler adjusting nut shown, are made from HTM metal . . . the metal with the high ultimate strength that resists wear and fatigue under heavy loads.

And there are lots of other "plus" advantages in HTM castings. For example, they possess excellent non-seizing properties . . . can be either liquid or air-quenched . . . can be given a smooth finish. Perhaps *most important of all, HTM machinability index ranges from 80 to 90 (B1112 steel = 100).*

HTM castings can often reduce manufacturing costs, weight and assembly time . . . can increase quality and sales potential of *your* product. AA-8746-A

***HTM**—*High Tensile (Heat-Treated) Malleable*

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Established 1868 • Cleveland 6, Ohio

the nation's largest independent producer of malleable and pearlitic malleable

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Red Circle Rolls for all Purposes

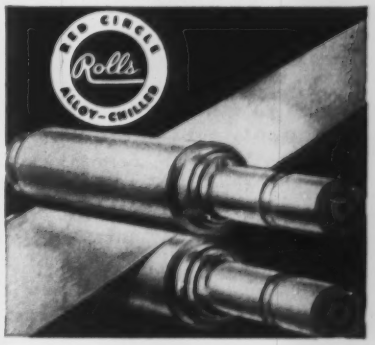
The Red Circle on the Roll is the Hyde Park mark of Quality. Hyde Park makes rolls for every type mill.

Chilled Rolls
Alloy Iron Rolls
Moly Rolls
Nickel Chilled Rolls
Grain Rolls
Cold Rolls
Sand Rolls

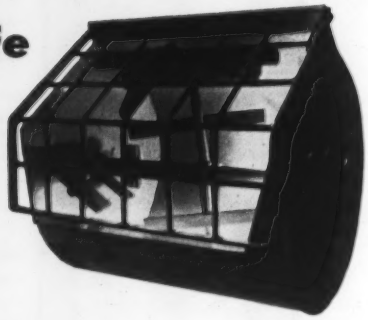
for
Finer Finish, Longer Life
and Greater Tonnage
specify Red Circle

Hyde Park

FOUNDRY & MACHINE CO.
Hyde Park, Westmoreland County, Pa.
ROLLS • ROLLING MILL MACHINERY
GREY IRON CASTINGS



How Mayari R lengthened the life of these mixer drums



Mixing mortar or terrazzo in a machine like this one puts the steel mixing drum through quite an ordeal. In earlier models the abrasive action of the batch against the drum walls caused excessive wearing of ordinary carbon-steel drums.

For longer drum life the Muller Machinery Co., Inc., of Metuchen, N. J., decided to utilize the superior abrasion-resistance of Mayari R steel. Now, using Mayari R sheet as heavy as 4-gage, they rotary-shear it, multiple-punch it, roll-form it, and weld it into a drum that outlasts the previous drums of carbon steel. And Mayari R has proved to be as readily workable and weldable as the steel they had used before.

Abrasion-resistance is by no means the only advantage to be gained in using Mayari R high-strength, low-alloy steel. Its high yield point permits designs of greater strength or lighter weight. It has 5 to 6 times more resistance to atmospheric corrosion than plain carbon steel, and holds paint up to 80 pct longer.

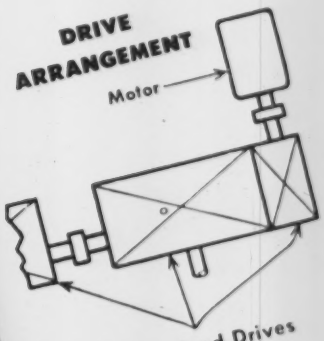
Catalog 353 covers the Mayari R subject in complete detail. A copy may be obtained promptly by writing to the nearest Bethlehem office.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mayari R...High-Strength, Corrosion-Resisting Steel

BETHLEHEM STEEL



3-Cleveland Drives

Note the small overhung reducer is transmitting power to both of the larger Clevelands—a compact but powerful drive arrangement.

CLEVELAND-driven scarfer dresses beryllium-copper slabs

SPECIALLY designed to handle beryllium-copper alloys, this automatic rotary scarfer puts smooth, clean surfaces on bar stock ranging from 5/16" to 1⅛" in thickness, up to 14" wide.

Drives are Cleveland Worm Gear Speed Reducers, actuating both the rotary tooth cutter and the bar-drawing mechanism. Power from the motor is transmitted at a uniform, predetermined rate, ensuring precision in product dimensions and economy of machine operation. Furthermore, the compactness of the right-angle Cleveland drive arrangement permits important space saving in the equipment installation.

Wherever you need to operate a machine efficiently, smoothly and economically, count on using a Cleveland. Let us send you Catalog 400 and the name of our nearest representative who is prepared to help you select Clevelands best fitted to solve your transmission needs. The Cleveland Worm & Gear Company, 3270 E. 80th St., Cleveland 4, O.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

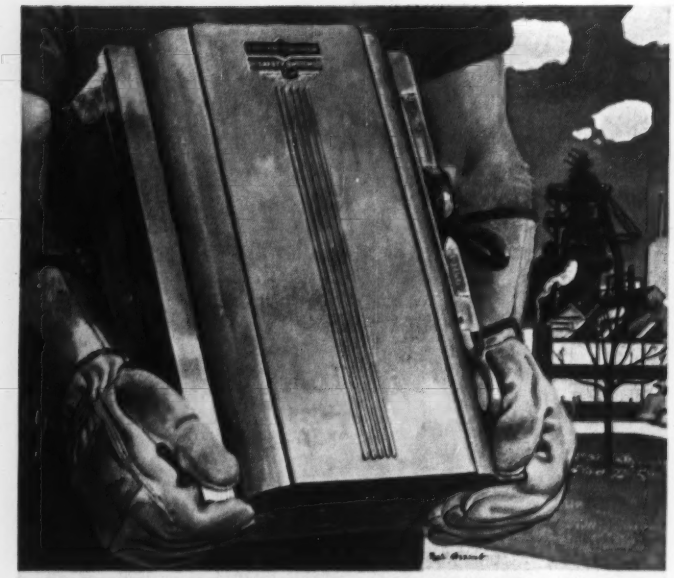
WHAT'S NEW IN MOTOR CONTROL? ★ ★ ★ GET IT FIRST IN CUTLER-HAMMER

Now...A Safety Switch Built to the Standards of Cutler-Hammer Three-Star Motor Control

☆ *installs easier*

☆ *works better*

☆ *lasts longer*



New Bulletin 4105 Safety Switch Type A, 30 to 1200 Amp. Sizes

Engineered for "heat-proof" dependability. New design for minimum internal heat generation; new materials for heat immunity.

Automatic pressure fuse receivers; no screws to forget to tighten . . . no screws to loosen in service by alternate expansion and contraction.

Visible blades for quick and sure inspection at all times. New double insulated steel operating hook. Safety is important in safety switches.

Panel mounted mechanism of this new Bul. 4105 Safety Switch is readily interchangeable with that of the old Bul. 4101 to permit replacements without case and conduit work.

The new Cutler-Hammer Three-Star Motor Control has proved a sensation wherever it has been tested in comparison with any other control equipment. The tougher the tests, the more dramatic has been its demonstrated superiority. A kaolin processing plant in Georgia, for example, reports: "Because of the hard service we give motor control in our plant, we have always had to replace contacts every 30 to 60 days. Our first Three-Star Control unit has now been in daily use for *thirteen months* and its original contacts still look and work like new." A lumber mill in California says: "Control contacts have always been a problem on our drive of the feed chain going to the trim saw. We had to replace contacts every few weeks. Our first Three-Star Control on this job, purchased from the stock of our local Cutler-Hammer distributor, is now in its *twenty-fourth month* of continuous daily operation with its original contacts still in service."

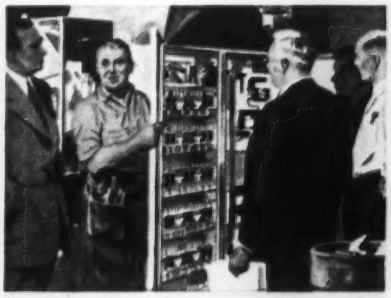
Such control equipment brings important operating dependability and savings to any job where an electric motor is used. But it also means that such better motor control should be matched with a safety switch which can equal the performance of the motor control. And now this is possible. Cutler-Hammer Authorized Distributors are now stocked and ready to serve you with the new Bul. 4105 Safety Switch, the safety switch built to the standards of Cutler-Hammer Three-Star Motor Control. It is loaded with new features. See it. Try it. Prove it. Order one today.

CUTLER-HAMMER, Inc., 1211 St. Paul Ave., Milwaukee 1, Wisconsin.

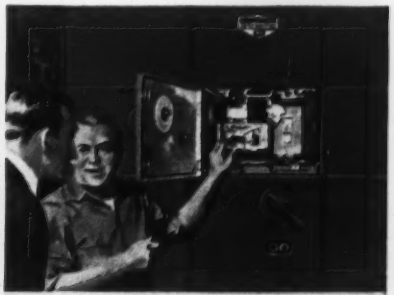
CUTLER-HAMMER
★ ★ ★
MOTOR CONTROL
C-H

Cutler-Hammer Three-Star Motor Control can now be obtained in every needed form

Cutler-Hammer Authorized Distributors carry stocks of Three-Star Motor Control in sizes and types of enclosures to meet all the usual industrial needs.



Leading machinery builders equip their machines with Cutler-Hammer Three-Star Motor Control as standard original equipment, often as components on panels.



The new Cutler-Hammer Three-Star Unitrol provides for the quickest installation or rearrangement of the finest in control equipment, C-H Three-Star Motor Control.